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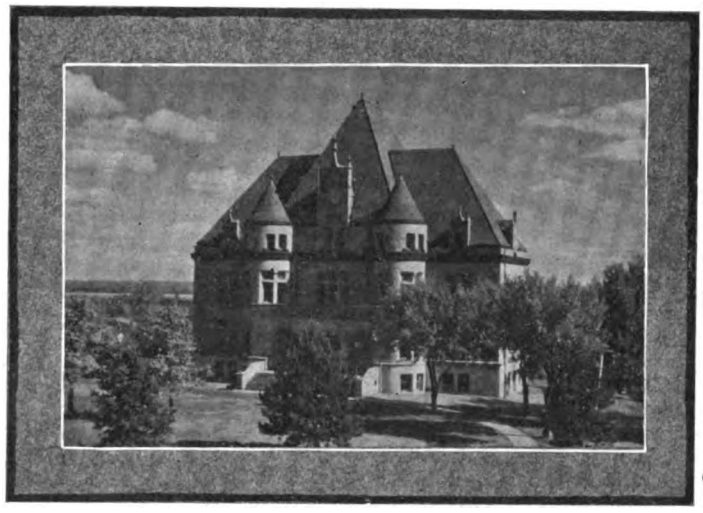
The Telephone Course at the University of Kansas

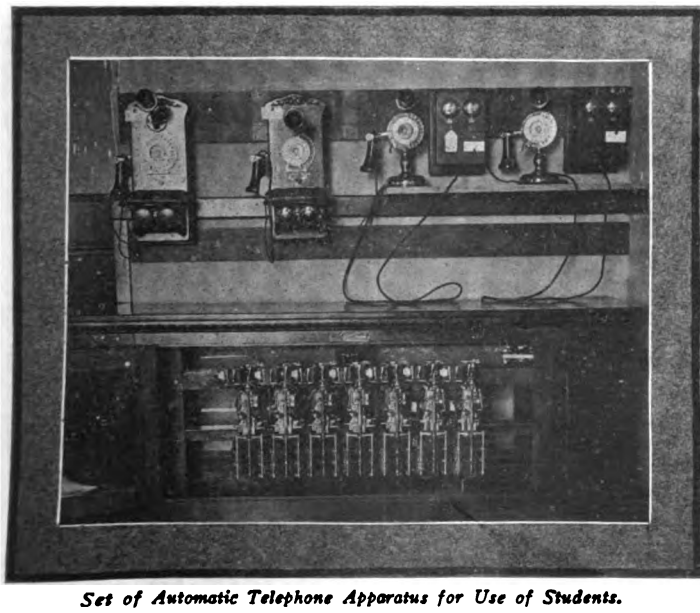
By Bruce V. Hill.

TELEPHONE work having in the past been mainly controlled by a few large corporations, has been thought by many to offer less opportunity for individual enterprise than other branches of engineering. The fact that a telephone, the part of the plant most commonly seen, is so unobtrusive an instrument, has given many students, and probably teachers and practical men as well, the feeling that there is really not much to learn about it and any one can handle telephone instruments. Still another thing that has a good deal of influence with young men is the desire "to see the wheels go 'round!" The ambitious young engineer imagines his efforts resulting in the erection of a large and noisy plant, not in a little piece of apparatus that can be put into a few inches of space. There is, however, a strong demand on the part of telephone companies for men who know something of the instruments with which they are to work. Telephone systems are places where "the rule of thumb" is not sufficient to produce results, and engineering students want instruction that will make them capable of starting their practical telephone work with a firm and useful foundation. In response to this desire on the part of the students the faculty of the University of Kansas, at Lawrence, Kas., decided at the beginning of the present academic year to establish such a course. The writer looked over the outlines of similar courses given by other institutions and talked with several engineers who are prominent in telephone engineering. One man, and a man for whose judgment he has a particularly high regard, said that the young men should be taught the principles of physics and mathematics and leave the technical details. Another man, who from his position sees the matter from a different standpoint, said: "Teach them circuits."



Building of Physics Department, University of Kansas, Where Telephone Course is Given.

After weighing the matter, certain principles seemed to be plain: Whether the faculty would or not, its teaching must be confined to the more elementary parts of the subject of telephony. In this, more than in any other field perhaps, because of its rapid changes, it seems to be true that no one can teach the practice of telephony unless he is actually engaged in it. Finance and economics as applied to any special field must also be learned by experience. The university has, therefore, made the course an elective in



Set of Automatic Telephone Apparatus for Use of Students.

Branch Exchange Switchboard Which Serves as an Example Manual Board.

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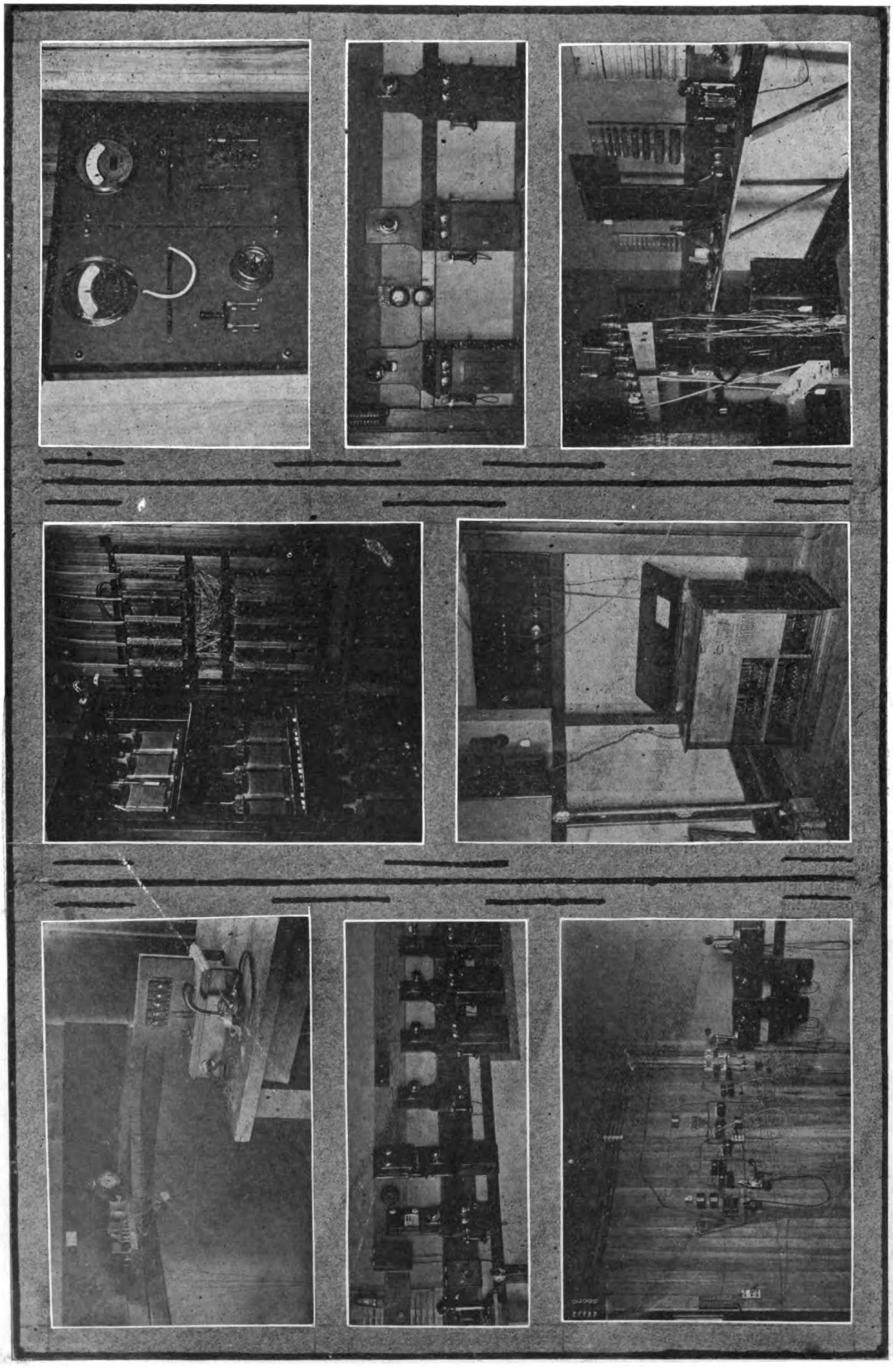

a. Battery testing outfit and small switchboard made by students.

b. Storage batteries and examples of cabling and cross-wiring for lines entering exchange.

c. Small power switchboard.

d. Sample telephones and phantom line terminal.

e. Other terminal of phantom, with protectors, coils, etc.

f. Complete line, cord, and operator's circuits laid out for demonstration.

g. Pole changer outfit forming part of laboratory equipment.

h. Samples of material for different parts of telephone plant.

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the senior year of the general course in electrical engineering. This course, requiring one hour in the class room and a minimum of eight hours in the laboratory per week for one semester with outside reading and the visiting of the local exchanges, serves to give the young men a working knowledge of the fundamental principles of the telephone. Beyond this, unless they take up problems in physical research relating to the telephone, they must in any case learn in the employ of some commercial organization.

The effort was made first to have the students understand thoroughly the principles underlying the operation of the telephone and then to familiarize themselves with the construction and circuits of a few of the more common and important types of instruments. They first studied the parts of which the instruments are made up. The electrical constants of these were measured. They were next given the parts necessary for the construction of a magneto switchboard. This board with the complete cord-circuit for connecting two lines is shown in Fig. 3*a*. The figure designated by the letter *c* shows the cord-circuit as set up by the students of the Kellogg central energy system with the harmonic ringing set. After thus tracing out the circuits necessary to connect two lines, the students have opportunity to study complete boards at the private branch exchange of the university, and in the exchanges in the city, to which they were very courteously given access.

The Automatic Electric Company of Chicago very kindly placed at the disposal of the university a good working exhibit of its apparatus. This is shown in Fig. 2. These instruments were installed in the various offices of the building, and the students made a thorough study of the working apparatus.

At the left of Fig. 3*a* is shown the apparatus for a test of dry cells carried on by two of the students. One of the young men spent considerable time in the study of voice currents by means of the oscillograph, while two others investigated the properties of a standard paper condensor.

Fig. 3*g* shows a Kellogg pole-changer set and transformer cabinet, which forms a part of the equipment studied.

Figs. 3*d* and *h* show parts of a very complete exhibit given by the Missouri and Kansas Telephone Company. It was its aim to show a sample of every form of construction which it commonly uses, including skeleton switchboards similar to that in Fig. 3*b*. The three instruments at the right of Fig. 3*d* are connected by two pairs of wires to the three in Fig. 3*e* in another room, the third line being a phantom, the principle and practical method of connecting this type of line being thus made plain.

The private branch exchange, installed by the Missouri and Kansas Telephone Company in the university, and connecting all the offices upon the campus as well as giving city connections, has been in charge of one of the advanced students in the employ of the Bell Company, and is very valuable as an adjunct in the class work in telephony.

The test of dry cells referred to above was done for one of the companies free of charge and the university is always glad to do anything it may of this kind. The writer acknowledges many courtesies which have been received from several companies, in assisting the university to secure its apparatus, so that with their co-operation, the University of Kansas is now in a position to claim the best equipment for the study of telephony which is to be found in any school west of the Mississippi River.

Telephone Transmission Measurements*

By B. S. Cohen and G. M. Shepherd.

FOR some time past, the advance in transmission study has been mainly on the theoretical side, and investigators into the value of inserting inductances into telephone lines, such as Pupin, G. A. Campbell, and Hayes, also Kennelly, have elaborated and put into workable form the original deductions of Oliver Heaviside on the transmission of alternating currents of variable frequency over telephone lines. In order to apply in a practical manner the laws which govern the transmission of telephone waves, it is necessary to have fairly accurate quantitative information regarding the various factors concerned. The latest formulæ for calculating attenuation take into account practically all these factors, and have been proved to give solutions of most of the transmission problems met with in practice, but, unfortunately, very little is known as to the value of most of these factors. As an example, what may be called the two fundamental factors in obtaining quantitative transmission results—viz., the average and highest important frequencies to be found in telephone speech waves—have been in the past more or less guessed at, and consequently very little information exists regarding many other factors which depend on them, such as line and apparatus impedances. The acquisition of any absolutely accurate figures is a matter of extreme difficulty owing to the large number of variables existing, but an endeavor has been made to get data sufficiently accurate for practical application. This has been rendered possible as a result of the introduction of a number of instruments suitable for measuring the various attributes of telephone waves and lines. The results described in this paper have been obtained in the investigation laboratory of the National Telephone Company, and embody methods of measuring frequency, distortion, attenuation, current and power of telephone waves, and also line and instrument impedances

Study of Wave-Form and Distortion.

As might be expected, the oscillograph has afforded a great deal of useful information with regard to telephone waves. The instrument used is the high-frequency pattern of Duddell. This instrument has two separate vibrators which can be used in a variety of ways. For investigating the attenuation and distortion of waves over telephone lines, one can be placed at the beginning and the other at the end of the line. Owing to the small resistance (about 10 ohms) of these vibrators and their negligible inductance, they have no appreciable disturbing effect on the circuit into which they are introduced. This oscillograph is used in conjunction with the falling photographic plate arrangement. Owing to the high frequency and general complexity of many of the telephone waves, it is very necessary that the vibrators should be working at their correct damping temperature in order to obtain reliable records. As mentioned by Duddell and others, the best test for correct damping is a square wave produced by interrupting a direct current.

Oscillograms of a number of vowel sounds as interpreted by a common battery solid-back transmitter working at normal load are shown in Fig. 1. These were continuously sounded into the transmitter mouthpiece. These vowel sounds are quite characteristic, and can be picked out in many oscillograms of complete words, although they get altered somewhat in shape by different voices. The small ripple on the flat portion of the E wave marked *y*, for example, is considerably amplified in some voices, and the portion *x* very often disappears completely. The main characteristics, however, remain. E appears to be much the simplest of all the vowel sounds. The falling-plate camera does not lend itself so readily to the recording of consonants, but by rapidly repeating the consonant and reducing the speed of the falling plate it is possible to obtain satisfactory records. Fig. 2 shows a number of consonants and words. The beginning and end of each word is indicated. These cases—"cur," "pea," and "tea"—which have all explosive consonants, are interesting. It will be seen that the explosive portion is quite separate and distinct from the vowel portion, being, in some cases, separated by an interval of quiesence. The question arose

*Abstract from a paper read before the Institution of Electrical Engineers, London.

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as to why the consonant portion in these cases should be generally of smaller amplitude than the vowel portion, as in the

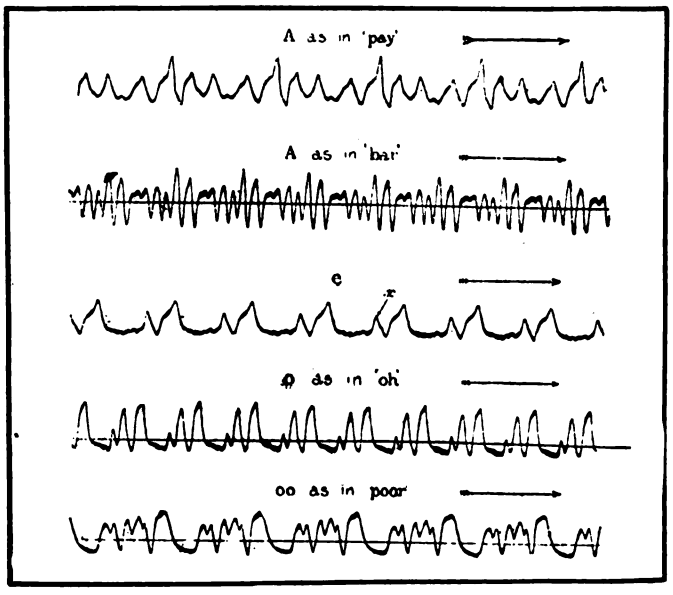

Fig. 1. Oscillograms of vowel tones spoken into solid back transmitter at normal load.

case of the originating sound wave the ear would appear to indicate that the reverse is the case. It was thought that this might be due to the transmitter diaphragm, which in the case of the solid back is somewhat heavy, and is strongly damped, and would not, therefore, respond to the brief consonant portion so well as to the vowel portions. In order to prove this, the same consonants were recorded, using both the solid back and a lighter diaphragm granular transmitter. Records obtained as a result of both these sets of tests are shown, and give a very fair idea of general conditions to be expected.

Fig. 3 shows the sound "tea" with the light diaphragm transmitter. In this case the consonant portion is nearly of the same amplitude as the vowel portion. The diaphragm is also very little damped and indicates high-frequency vibrations in the interval between the consonant and the vowel which were not shown up by the solid back. Fig. 3 also shows an oscillogram of the consonant portion of "tea" taken by itself. This is clearly a reproduction of part of the preceding figure and helps to prove the accuracy of these oscillograms. It is interesting to note that the tests of the particular light diaphragm

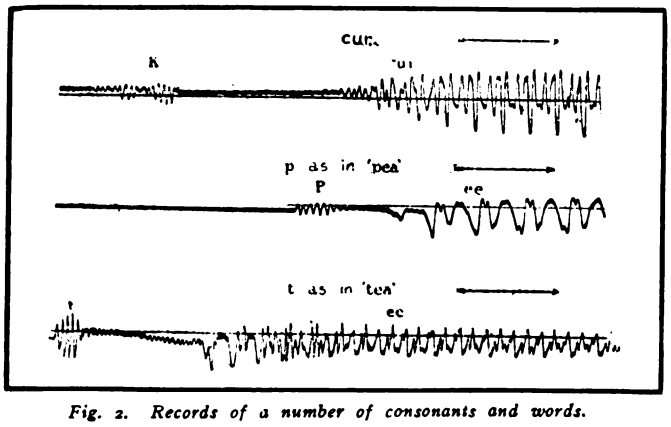

Fig. 2. Records of a number of consonants and words.

transmitter used gave articulation superior to that of the solid back, although the former transmitter was in some ways inferior to the latter. It may be of interest to mention that the most efficient sound from the point of view of amplitude is the "oo" vowel sound as in poor, whilst the least efficient sounds are the consonants "s" and the rolled "r"; the "r," which is of very high frequency, is depicted in Fig. 4. It will be noted here that the vibrations are so delicate that the destructive influence of the line upon their characteristic form, as indicated by diagrams to be shown later, would be very considerable.

(*To be continued.*)

DID SHE CHOOSE THE RIGHT REMEDY?

"I'VE heard queer reasons for having telephones taken out," said an employe of a telephone company, according to an exchange, "but a woman in an apartment house told me a new one the other day when I went out after her telephone. "She said something about how she would miss the service,

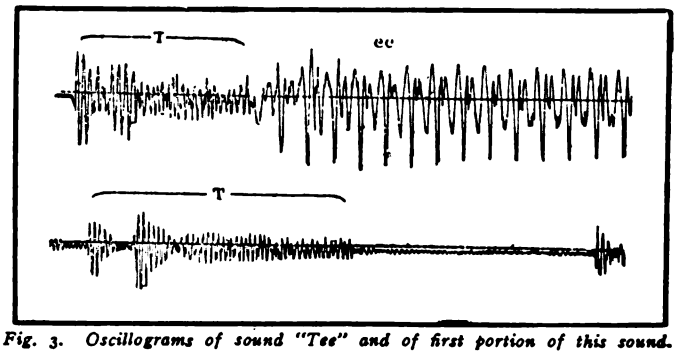

Fig. 3. Oscillograms of sound "Tee" and of first portion of this sound.

and that was my tip to find out why she was having it taken out if she was going to miss it.

"'Hasn't the service been good?' I asked her, and she said, 'No, it wasn't the service that she objected to.' Then she opened up and told me about it.

"'I would be willing to let the neighbors come in and use the thing all they want to,' she told me, 'but when the woman across the hall was asking me about three times a day if I wouldn't give her husband a message over the telephone for her, as she was too busy to wait for the connection, I decided to have it taken out.'"

STANDARD METHOD OF NUMBERING CROSS ARM PINS.

IN our issue of June 8th was published a request by a subscriber for information about the numbering of cross-arm pins. The following letter gives information on this point:

"The standard method employed by all Bell companies, the writer believes, is to number from left to right with the back to the exchange. Probably this method is also employed by most of the large independent companies.

"This method is preferable to others, as there is practically no

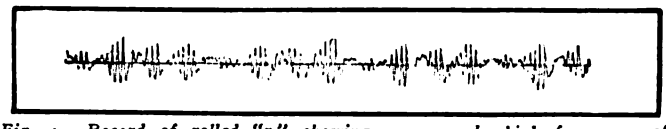

Fig. 4. Record of rolled "r," showing uncommonly high frequency of alternations.

chance for a mistake in counting pins when looking for a certain line, no matter how many times the lead may divide or turn.

"If pins should be numbered to read in order when one is facing north or west and a lead should run from north to south, then to the southeast, then directly east and then turn north again, there would be many chances for error.

"It is to be understood that 'back to the exchange' means 'back to the starting point of the lead,' even though one might be facing the exchange when counting, if the lead should turn a number of times; also that in case of trunk lines the exchange of reference is the one nearer the headquarters of the company."

TEXANS VOTE FOR INDEPENDENT TELEPHONE COMPANY.

VOTERS of Amarillo, Texas, in the city election held June 27 declared in favor of granting a franchise for an Independent telephone system. The vote stood 297 to 68. The franchise is to be awarded to H. H. Davenport & Co., of Hillsboro. It is to run for a term of thirty years, and binds the company to install a modern system, costing approximately $100,000.

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Maintenance and Operation of Telephone Service on Railroad Companies' Lines*

By S. L. Van Akin, Jr., *Ass't Sup't Telegraph, New York Central Lines.*

TELEPHONE companies' lines are invariably constructed along public highways or on private property where tree trimming privileges cannot be obtained, in consequence of which their standard minimum insulation is ten megohms per mile in clear weather. The insulation resistance of open line wires on railroad companies will, in clear weather, show as high as sixty or seventy megohms per mile. The reason for this is that railroad companies' lines are on their right of way where there is seldom any question regarding trimming rights and privileges, and thus a high standard of insulation, which is essential to good transmission can be maintained.

The practice of utilizing Wheatstone bridge measurements to locate trouble on telephone companies' lines, is not employed effectually at long range on account of distributed leakage. Numerous testing points are, therefore, essential, being located on an average of every five miles, while on railroad companies' lines they are located on an average of every twenty miles, and the Wheatstone bridge measurements are here effectually employed at long range, and trouble located very closely where a high standard of insulation is maintained, the results of such tests being seldom more than three or four ohms at variance.

As parallel circuits are seldom available to patch out on railroad companies' lines, it is needless to say that in case of interruption, communication cannot be restored until the cause has been removed; while on the other hand, telephone companies have various routes over which to switch their business in case one should fail. They also have parallel circuits with which to patch their most important circuits, and it is not as essential for them to hasten repairs as it is where similar conditions do not obtain.

To successfully operate a long distance telephone circuit on a railroad company's line, the most important requisite is a monitoring wire chief whose good judgment can be relied upon. It is also essential to have wire chiefs who are both telephone and practical railroad men, and a set of fixed rules that are comprehensive and definite.

The monitoring wire chiefs' duties can be summarized as follows:

He should watch the lines closely for any irregularities in the service, such as line trouble, noisy connections or unlawful use of the lines. He should see that employes are attentive to duty, that the rules and instructions for the operation and maintenance of the service are complied with, that employes are courteous in the performance of their work, and that all calls are promptly and properly established and no partiality shown in the matter of precedence to establish connections. He should assist in any lawful way to accelerate the service, establish morning test calls and, whenever necessary to improve transmission, place telephone repeaters in the line and see that they are always in good condition. He should be responsible for the prompt clearing of the line of all switchboard connections on through calls, test the line to ascertain positively whether all switchboard connections, simplex coils, bells, etc., have been removed, and the line connected through at test boards and test panels before establishing the connection. He should keep a complete record of all interruptions and trouble on the line and inform the superintendent of telegraph promptly of such interruptions or trouble, and advise him when communication is restored. He should check the standard of insulation and resistance of the entire line at least once each month, supervising the work of other wire chiefs who are expected to manage the offices at which they are located, while at the same time they have other duties likely to distract them from this particular line of thought and work.

Wire chiefs should be located at division terminals if possible, as is also the case with the monitoring wire chiefs. The latter, however, must be located at telephone repeater stations where repeaters are used, and these stations should be equipped with every convenience for the proper handling and supervision of the service.

The telephone set on a monitoring board should be equipped with a high impedance receiver so that the monitor can remain in on connections without noticeable loss in transmission; and, if a small switchboard is necessary at such a point for switching long distance connections, he should, to be in close touch with the operators and operation, handle it personally when on duty and closely watch the nature of the business transacted.

When there is a congestion of calls between two stations, operators will often insist on holding the line for more than a reasonable length of time, and calls waiting on other sections of the line would be delayed for hours, and if the monitoring wire chief is not authorized and empowered to settle disputes and questions between operators and those using the service, the situation will immediately become chaotic. One of the most important duties of a monitoring wire chief is to see that all stations have equal opportunity to establish calls.

Rules to govern telephone service on railroad companies' lines are compiled to furnish the best service possible with limited facilities, and to transact a maximum amount of company business. Company business is defined as that which relates to matters that strictly belong to the operation and maintenance of the railroad or are of interest to the railroad company; in other words, official business, which must be transacted without delay.

The demands of official business on one long distance circuit are so great that all unimportant matters, as well as private matters, must be eliminated; as, otherwise, the congestion of the service would be unbearable. If conductors, engineers, brakemen, firemen and all others not directly connected with the operating department were allowed to make use of the limited service, it would be next to impossible to transact important business; and then again, their communications usually consist of personal grievances which the division officials do not care to discuss by telephone, it being detrimental to good discipline, and they are averse to allowing employes such privileges.

To meet the demands of the service as far as possible, and transact a maximum amount of business, it will be found necessary to limit calls during office hours to three minutes, excepting those made personally by certain company officials, whose communications should be unlimited. In order to protect unlimited service calls, a list of those entitled to unlimited service and precedence should be compiled and embodied in the fixed rules.

On the New York Central Company's lines between New York and Buffalo, and the Lake Shore Company's line between Buffalo and Chicago, precedence and unlimited service are accorded to the president, vice-presidents, general managers, assistant general managers, general superintendents, superintendents of telegraph (who are responsible for the service), and chief engineers. These officials authorize the symbol "39" when they require immediate service, upon receipt of which telephone operators proceed to clear the advance line of all limited service calls and immediately establish the "39" connection.

When calls are made personally by the above named officials without authorizing "39," they are handled as "specials," *i. e.*, they are established next after the completion of any call or

*Abstract from a paper read before the Association of Railway Telegraph Superintendents at Atlantic City, N. J., June 20th, 1907.

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expiration of a time limit. Immediately after the expiration of unlimited service calls, the connections that were cut off to establish them are re-established.

On account of the lines referred to being used for both short and long haul connections, the direct New York-Chicago circuit is connected into nine private branch exchanges, and at each of these points the line is bridged with 2,500 ohm bells; and, to operate Morse over the New York-Buffalo section, the line is equipped with six 37-A Western Electric repeating coils. The impedance offered by each of these coils is equal to about forty miles of 8 B.W.G. open copper line metallic circuit.

It was impossible to obtain good transmission on the line "bridged" with bells at seven intermediate stations, and with approximately the equivalent of two hundred and forty miles of additional circuit, due to the repeating coils, therefore it was necessary to inaugurate a system to quickly clear the line of everything that would impede transmission, as follows:

The signal symbol "39" is authorized by operators and wire chiefs on all calls between points on the New York Central lines, and points on the Lake Shore lines exclusive of Buffalo. The operator at the originating station immediately clears the advance line of limited service calls and passes the symbol, naming destination, to the advance station, and then notifies the home wire chief. Operators at intermediate advance stations immediately clear the advance line, relay the symbol and notify their wire chiefs of the "39" connection. The wire chiefs so notified immediately acknowledge the symbol call notice to the monitoring station and connect the line straight through at the line jacks. As soon as the monitoring wire chiefs are in communication on all New York-Chicago calls it requires about thirty seconds to test the line between Ravena, N. Y., and Elkhart, Ind., a distance of seven hundred miles, to see that it is absolutely clear of all office equipment. If they find that some one has failed to connect the lines straight through, which is very seldom the case, it may take an additional one minute to remove the remaining equipment. Assuming that the line is found to be clear, they immediately notify the originating and terminating stations to proceed, and at the same time insert the telephone repeaters in the line. To follow these instructions to the letter and establish a call between New York and Chicago covers a period of about six minutes, and the quality of transmission is dependable.

Reviewing what has been said with regard to establishing through calls on the New York-Chicago circuit, it will be seen that all difficulties due to the "bridging bells" have been removed, that the line has been shortened, approximately, two hundred and forty miles by the removal of the simplex coils, and as the two sets of telephone repeaters are equivalent to three hundred and sixty miles gain in transmission, that the total of nine hundred and seventy railroad miles is reduced to six hundred and ten open line transmission miles.

After a through "39" call is completed, the monitoring wire chiefs (who are monitoring the service at the repeaters), immediately notify all intermediate wire chiefs by Morse that the line is released from the through service. The intermediate wire chiefs watch a designated wire until the notice of release is received, whereupon they connect all equipment normal and notify their switchboard operators accordingly. The telephone circuit is invariably cleared and placed in local service in the insignificant period of thirty seconds.

Referring to the local operation of the line that all stations may have equal opportunity to establish calls, a ruling is enforced that no two stations, under equal conditions, shall be allowed to hold the line to establish more than six calls or for a time period of thirty consecutive minutes. Unless the use of the line is so limited, it would be impossible to transact business between all points without protracted delays at one point or another.

Telephone service on the New York Central lines was proposed in 1902, authorized in June, 1903, and the line construction completed December 3, 1904; but the quality of transmission obtained between New York and Chicago was very unsatisfactory up to August, 1906.

Established precedent in the operation of the line was the principal cause for much of the confusion and difficult transmission experienced previous to this date; the radical departure outlined above has brought about the present satisfactory conditions.

"INFORMATION?"

SOME weeks ago there were published a considerable number of remarkable queries which have actually been received at the information desk of a telephone exchange. The list was by no means exhausted and the following are a few additional questions copied from the notes of the operators who have copied the questions just as they were received:

"Can you tell me the number of the new hotel that went up in Northbrook (a city 30 miles away) last year?"

"Give me the number of some one who will come up into the 15th ward and get a man to vote."

"Who shall I call up to get a berth on the boat tonight?"

"Information! Can you help me out? I told a dressmaker on Avenue E that I would call her up, and I have forgotten her name, number and everything else."

"Where can I get a marriage license?" (Oh, joy!)

"I want to get some people and I don't know their name or number. You go out the Avenue E car line to the end of the line and take the road that turns to the left, and they live up on the highlands. Can you tell me who they are?"

"What time does the curtain go up at the theater tonight?"

Another from the leading hotel: "Central, send me up a dish of Force and some cream."

"Say, will my father have to pay for his telephone today?"

"Give me the number of the Wintergreen Cemetery." (Evergreen was the correct name.)

"Please give me the number of the place down on F St. where they fix wires on cars."

"What time do the mails close for Billtown? (A country town about 15 miles away.)

"Give me the number of the telephone of the Universal Identification Society."

"This is 50 G St. Give me the name of a hair dresser where you don't have to make an appointment, and give it to me quick, too!"

"Information! Can you tell me if a little round, black purse was found in the car going to Southport Thursday night?" (There are only about 75 cars a day to this point.)

"Say, do you want any new 'Hello girls' over there?"

"Can you tell me if State Attorney Brown is in town today or not?"

"Do you know Mr. King, whose coachman is a colored man?"

"Can I get a ticket for the Messiah after six o'clock this evening?"

Dec. 19. "Please tell me what is Santa Claus' number?" (Bless her darling heart. Information told her that Santa Claus was so busy making toys for Christmas that he wouldn't answer his telephone. This satisfied her and did not disturb that beautiful belief that there is a Santa Claus.)

"Give me Penny." Information: "What?" "I didn't ask you to tell me where I lived. Shut up."

"Give me the number for the garbage call."

Man at a pay station: "I want an official of the telephone company. He is a stout man and wears glasses. Don't know his name."

"Central, can you tell me the verdict in the Nan Patterson case?"

"Information! There is an old stray cat around here. Will you tell me who to call to come and take her away?"

Christmas Day. "Will the mail be delivered today?"

And so on *ad infinitum*. All the varied phases of human nature are shown over the wire. Questions from men, women and children, showing mental balance and unbalance, more frequently the latter. For the information bureau operator, however, it is all in the day's work; most are answered, some are not. Reader, try; how many could you answer?

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From Here and There

WISCONSIN LEGISLATURE KILLS OBNOXIOUS TELEPHONE MEASURES.

INDEPENDENT telephone companies of Wisconsin have been for some time past vigorously opposing the attempts of certain interests to force the passage of two very obnoxious bills by the present Wisconsin legislature, one of these measures providing for the physical connection of competing telephone companies, and the other being a provision preventing the installation of a second telephone plant in cities where there is already operating an exchange belonging to one corporation. It is reported that at first the compulsory physical connection measure was vigorously opposed by the Bell company of Wisconsin and its sublicensees. At the time this opposition was being carried on the so-called public utilities bill contained the monopoly provision applying to telephones. Afterward this public utilities bill was redrafted and that provision omitted, and from that time on the Bell organization changed front, and was publicly in favor of the compulsory connection measure. Of course its passage would have given the Bell people the advantage of connection with local Independent telephone systems.

The failure of the powers behind these bills to push them through will mean a great deal for the Independent telephone development of the State, as the telephone companies will now be in a position to push construction work rapidly, and build up local and long distance systems.

MORE FOREST SERVICE TELEPHONE LINES TO BE BUILT IN THE NORTHWEST.

THE U. S. forest service has begun work on telephone lines in the Hell Gate national forest and the Montana portion of the Bitter Root forest, east of Spokane, Wash. One line from Darby to Alta, 37 miles, and another 25 miles, from Darby to an important ranger's station at Rose Kole, will be built. These lines will give ready communication between distant parts of these national forests and the headquarters of the supervisor at Missoula. These national forest telephone lines are growing in favor among the settlers, affording as they do telephonic facilities not otherwise likely to be supplied.

A MATHEMATICAL DISCUSSION OF THE MUTUAL INDUCTANCE OF COAXIAL SOLENOIDS.

THE use of coaxial solenoids is so common in telephone practice that those who are interested in a mathematical investigation of the subject will welcome with a great deal of interest the discussions furnished in the last issue of the Bulletin of the Bureau of Standards, published by the Department of Commerce and Labor, Washington, D. C. This issue contains two articles on the subject, the first being "An Exact Formula for the Mutual Inductance of Coaxial Solenoids," by Louis Cohen, and the second "The Mutual Inductance of Coaxial Solenoids," by E. B. Rosa and L. Cohen. There is also a very interesting discussion by L. W. Austin on "The Production of High Frequency Oscillations from the Electric Arc," a subject which those who are following experiments in wireless telephony have come to view with a great deal of interest.

LATEST TELEPHONE NOVELTY REPORTED FROM EVANSTON, ILL.

NEWSPAPER reports state that certain residents of Evanston, Ill., are painting their telephone numbers on their cows. One of the dispatches reads as follows: "A new style in brands is in vogue among Evanston cows, and instead of being marked with symbols burned into their flanks, they have painted the number of their owner's telephone.

"William French, of Chicago, invented the new style when his 'mooley' Mary Jane began getting lost.

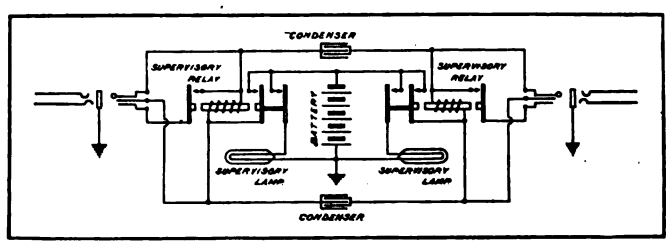
"He had his telephone number affixed to her side so that if she should stray from home he might be promptly notified and bring the animal back in time to furnish the evening's supply of milk. Other cow owners have seen how well the plan worked, and have adopted it."

This sounds like a good scheme! Why not put the telephone number on dog collars, too?

A CIRCUIT FOR LAMP SIGNAL SUPERVISION ON A MAGNETO BOARD.

OUR answer to a recent inquiry from a correspondent has brought forth a letter from which we quote as follows:

"In looking over the JOURNAL of June 22d, I was very much interested in the question and answer No. 875; not so much in the question as in the answer given. In the first place the person answering the question has gone back to the old discarded idea first used in common battery switchboards, namely, lighting the lamp in series with the line circuit. This has been demonstrated to be impracticable except in exchanges where the



Cord Circuit for Double Lamp Supervision on Magneto Switchboard.

line resistance has but a few ohms variation. It is the writer's opinion that it will be next to impossible to procure a relay that will hold up through such a resistance as described in the answer. It is also noted that the circuit shows the sleeve side of the cord circuit connected to one side of battery and since the battery is common to the entire board, the sleeve conductors of all cord circuits are tied together. There is then no reason for having four condensers in such a circuit. The condensers used in series with the relays are not needed.

"To give you my idea of what a cord circuit of this type should be, I will make a rough sketch omitting the ringing and listening keys. It is impossible to operate this kind of a system with a two conductor cord circuit, as one side of the battery should be fed over the local conductors for holding up the relay when once operated.

"In the circuit shown it will be noted that the relay, when once operated by the hand generator at the subscriber's telephone, will receive battery over one of its armatures, and ground over another, completing a closed battery circuit, thus locking itself in this position. Another armature closes a battery circuit through the supervisory lamp and it will be seen that this is an entirely local circuit, which should be the case with all lamp circuits. "G. A. Joy."

If any other telephone men would like to send in descriptions of circuits of this type which are now in actual service the Editor would be glad to put such information as is available before those interested.

FEATURES OF A PROFITABLE DIRECTORY.

TWENTY-FIVE pages of the latest directory of the Maryland Telephone Co., of Baltimore, are given up to lists of rates to points which subscribers may reach over Independent toll and long distance lines. Other interesting features are the usual large number of advertisements, which produce a substantial revenue, and the marginal advertisements of the company's service. The cover bears a slip ruled for date and signature, and headed as follows: "Publicity is the basis of good advertising. This book is referred to 50,000,000 times a year. It will pay you to advertise in it. No other medium of an equal and persistent circulation. If interested, mail this card to Traffic Department."

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As the Editor Sees It

THE "COMMUNICATION ENGINEER."

UNTIL a comparatively short time ago no one ever heard of a telephone engineer. Now there are hundreds of men in the country who, more or less justly, are considered to have claims to such a title. They must look closely to their laurels, however, for in the near future a person who is merely a telephone engineer will only occupy a secondary position on the scale of comparative rating.

The modern telephone engineer is rapidly invading the telegraph field. Telegraph messages today supply a very considerable portion of the revenue derived by telephone companies from the use of their long distance lines, and the demand upon engineers for a knowledge of telegraphy is constantly growing in breadth. On the other hand, the men who formerly confined themselves wholly to telegraph practice are entering the province of the telephone man. For example, Mr. Van Akin's paper, in this number of the JOURNAL, shows very conclusively that railway telegraph superintendents are meeting some very interesting problems in connection with their telephone lines, which have only been installed a comparatively short time. In working out their methods of operation and maintenance the telegraph superintendents have acquired a special knowledge of telephony which gives them a certain facility in handling the two most important methods of communication by the aid of electricity.

It is on account of this mingling of duties and abilities that the term telephone engineer will soon become one of too limited application. We need a phrase which will be at once broader and more descriptive. Some one has suggested "Communication Engineer," but it may be that this is hardly descriptive enough, and some will object to the sound of the title. Fame awaits the man who will suggest the right word!

WAVE FORMS AND LINE BUILDING.

DISTORTION of electrical waves corresponding to the different groups of sound waves sent into a transmitter is the usual reason for poor transmission over a telephone line. The determination of the exact character and amount of such distortion of each of the different letters of the alphabet would seem to be a fit subject for a series of fundamental investigations which would have a very serious and practical bearing on the subject of telephone line building. With accurate data on this important branch of physical knowledge at hand, and a more exact idea of the effect produced upon wave forms by varying the electrical constants of a line, it is probable that many telephone engineers would be able to attack transmission problems more directly and vigorously than they do at present.

At various times in the past few years the results of investigations of electrical wave forms arising during the process of transmitting speech over wires have been published. The last account of such a series of investigations is that in the paper of Messrs. Cohen and Shepherd, a portion of which appears upon other pages of this number of the JOURNAL. This paper apparently shows that many of the practical problems relating to the methods of measuring wave forms have been settled, and, with these difficulties overcome to so large an extent, it has been possible to give a very practical direction to the experiments. In other words, it may be assumed that the authors of the present paper have definitely attacked the problem of finding out just what electrical phenomena arise from the action of sound waves upon the diaphragm of a transmitter connected to a certain definite line, and just how the phenomena at the originating end of the line are modified by the action of the resistance, capacity and inductance of the line at the time they reach the receiving end.

The line of attack which is set forth covers a very broad and complex field, and the amount of work which still remains to be done to secure additional data, and fit the figures obtained by such investigations into actual practice and make them universally available, is undoubtedly enormous. For example, it is now generally understood that the ear is capable of recognizing the meaning of a combination of sound waves emanating from a receiver which is operated by electrical waves which have been vastly distorted from the form corresponding to the original sound waves in the transmitter. The admissible amount of distortion for commercial transmission is, however, less for certain sounds than for others, and this suggests immediately what is practically a very large sub-division of the general subject which requires careful research. Then, too, it is well known that the transmitting efficiency of any line varies greatly from day to day. It is conceivable that at some future date investigations along the lines indicated by the present paper will furnish a means of educating a wire chief so that, in case of the existence of a number of minor troubles on a toll line, having in combination the effect of destroying transmitting efficiency, he could direct their removal in the exact order which would most quickly restore the line to service.

In any event, while the value of such investigations will now be generally recognized, their influences in any substantial degree upon commercial practice seems to be a matter for the not too near future. The advisability for carrying them on for such future good is said to have been fairly pointed out by Mr. Herbert Laws Webb during the discussion of the paper in London. The practicability of such work lies in the fact that it is likely to more than pay for itself in the long run by making it possible for engineers to secure a standard transmitting efficiency by a smaller expenditure for line construction than is the present practice, thus affecting a saving in a part of the plant which represents a very high proportion of the entire cost.

THE CALL BY NAME NUISANCE.

FAILURE on the part of subscribers to give the number in calling for a connection is one of the principal causes of poor service in many small exchanges. The annoyance is a petty one, but none the less hard to overcome. A subscriber oftentimes seems to be absolutely determined to refrain from aiding the telephone company according to the expressed wishes of the latter.

The reason for this is not hard to seek. The subscriber is aware that the operator knows the number of the person he desires, and is able to connect him promptly without referring to the book, if she will do so. In case of an unknown number a subscriber must himself refer to the book before he can give the call properly. If he calls by name no reference to a list is necessary, time is saved, and what appears to be useless work is avoided. He seems to be wholly unable to put himself in the telephone company's place, and foresee the possible state of affairs in a time of emergency. Then, with all the subscribers giving names to operators who had no means of associating them with the numbers there could hardly be imagined a more certain cause for confusion. Frequently this is experienced with a night operator, to the annoyance of some particular subscriber, who in spite of this cannot be persuaded by the repeated admonitions of the operators to call by number only. He persists in using the names of the persons with whom communication is desired, thus causing delay in the securing of the desired connection as well as confusion to the operator.

To overcome this tendency is more difficult than it ought to be, because many oppose the "calling by number" system as a matter of principle, deriving their false notions from following the course of reasoning just outlined. These obstinate ones need to receive a personal visit from the manager, and have the whole thing explained to them. It is not too difficult for him to go over with them all the benefits derived from the standardization of service, and also the faults which arise from a lack of such standardization. The result will almost invariably be to convert the subscriber into a willing aid to the general purpose, so the time taken up in these explanations will usually be very well spent.

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The Law and Its Workings

CONDUCTED BY A. H. McMILLAN.

REMOVAL OF POLES LOCATED UNDER FRANCHISE.

We have a franchise for the streets and alleys of the town which says that poles are to be set under direction of the street committee. We have some poles located on one of the streets here by their committee, and they now order us to remove these poles. Can we be compelled to move these poles? We have cable on them, and they want it moved, so that we can't make a safe cable job of it.

Will you kindly refer us to any similar cases you may have on record? This matter will come to an issue soon, so will appreciate very much if you would get reply to us either direct or through your valuable Journal at your earliest convenience. W. M. H.

THE franchise for the use of the streets and alleys of the town amounts to a contract between your company and the municipality. The municipal authority very clearly has the right to couple with the permission to use the streets such conditions as are deemed wise and necessary; but this authority cannot, at its mere whim, annul the act which has legalized the occupation of the streets. Hudson Tel. Co. vs. Jersey City; 49 N. J. L., 303; 60 A. R., 619; 8 A., 123. It therefore follows that you cannot now be compelled to move your poles without any just and sufficient reason. However, under the power of police authority, a municipality may make such changes in a grant to telephone companies when the same is for the interest of the public, provided vested rights are not impaired. If there arises any just cause for the change in the location of poles, such as the fact that they become dangerous to the public, the municipal authorities may change the location. American Telegraph & Telephone Co. vs. Mill Creek Township, 46 At., 140; Gans vs. Ohio Postal Telegraph Cable Co., 140 F., 692; City of Hannibal vs. Missouri & Kansas Tel. Co., 31 Mo. App., 23. If the new location proposed by the street committee is such that you cannot safely string your cables, committee cannot compel you to adopt the new location, because it is your duty to have your poles safely located at your peril. The fact that the location was prescribed by the street committee would not protect you against damages at a suit of anyone injured.

INJURY BY LIGHTNING ENTERING HOUSE OVER OLD TELEPHONE WIRES.

LEWIS EVANS owns a house in Proctor, Kentucky. In August, 1902, he had an instrument of the Eastern Kentucky Telegraph & Telephone Company installed. At the end of the year he notified the company to remove the telephone box and wires from the house. The company took out the telephone box, but not the wires. In July, 1904, during a severe thunder storm, lightning struck a locust tree nearby to which a wire of the telephone company was attached. The lightning tore up the tree and passed along the wire into the house, which was considerably damaged. Evans sued the company for damages and the court entered a judgment for the company, insisting that the loss was due to an act of God, and that the plaintiff was as much responsible for the trouble as the company. The court held that while lightning is an act of God, the carrying of the lightning into the house on a telephone wire was the act of the company, and the case should have been submitted to a jury. Evans vs. Eastern Kentucky Tel. & Tel. Co., 99 S. W., 936.

CITY'S RIGHT TO IMPOSE CONDITIONS WHICH ARE NOT TO APPLY WHEN ANOTHER COMPANY GETS SAME PRIVILEGES.

AN interesting opinion has been given by William B. Ellison, corporation counsel to the Board of Estimate and Apportionment of New York City, covering the question whether an exclusive franchise can be granted to a telephone company, or an arrangement equivalent thereto made. The question is unqualifiedly answered to the effect that "a city has no power to grant a monopoly for the operation of a telephone system in the public streets." This is not the real question discussed in the opinion, but the opinion deals with the question of whether the city has a right to impose conditions in the granting of a franchise which is accepted by the company, such terms and conditions, in their original form not to apply when a similar right is exercised by another company. The question is raised in connection with the application of the Atlantic Telephone Company for a franchise. The opinion of the corporation counsel is that the right to operate a telephone system may be granted upon certain payments which are to continue only so long as the company enjoys the sole privilege of supplying such service, provisions being made for the reduction of terms if other systems are established or other franchises granted. Such a grant would not be a bar to the city's making subsequent grants to other companies.

The above opinion suggests a satisfactory arrangement to be made with a city which is willing to grant large privileges to secure the establishment of a telephone system, and is as near an exclusive franchise as the law will permit, unless the municipality, in its charter, is expressly given authority to grant exclusive franchises.

TELEPHONE COMPANY NOT AN INSURER AGAINST ELECTRIC SHOCKS.

IT has been decided by the Court of Appeals in Kentucky that a public telephone company, inviting the public to use its instruments, is not an insurer against injuries from electric shocks, but must use such care as may reasonably be expected of a person of ordinary prudence under the circumstances.

This was in a suit brought by Frank J. Brucker against the Gainesboro Telephone Company. While a guest at a hotel in Sumerset, Ky., he went into a pay station booth to use the telephone. The telephone not working well, he took hold of the metal arm with his hand to raise the mouthpiece, and at once received a severe shock of electricity which knocked him to the floor, rendering him unconscious and injuring his nerves. The company proved that ten minutes after the accident the telephone was examined by one of its men and found to be all right. It had not been out of order before, and the cause of the accident was entirely unexplained. There was no storm at the time. An electric light was burning in the booth, but the telephone company's voltage was not sufficiently high to hurt anyone. The telephone company won the case, and the decision was framed by the Court of Appeals, the rule of law first quoted being laid down. Brucker vs. Gainesboro Tel Co., 00 S. W., 240.

INJURY TO LINEMAN FROM FEED WIRES.

THE lineman of a telegraph company received an injury from coming into contact with feed wires of an electric railway company while ascending a pole. He sued the telegraph company and the railway company jointly for damages, alleging that defendants failed to furnish him a safe place to work, to warn him of hidden dangers and to insulate the feed wires. He obtained judgment against the telegraph company, which appealed the case to the Supreme Court of Illinois. The court held that his employer owed him the duty of warning him where the master knew of peculiar dangers which the lineman would encounter, even though the duty of inspecting wires and poles is ordinarily upon the lineman.

The hidden danger in this case was found to have consisted in the fact that the electric railway company was using uninsulated feed wires so placed on the poles as to indicate that they were not dangerous. The court found that there was evidence in the case to justify a finding that the company, through its foreman, was negligent in requiring the lineman to ascend the pole. Judgment against the telegraph company was affirmed. Postal Telegraph Cable Co. vs. Likes, 80 N. E., 186.

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Your Question—Our Answer

BAD CONNECTION ON C. B. LINE.—(881.)

We have a common battery instrument in a residence private line which at times rings open. There is a 2 M. F. condenser in the ringer circuit, sometimes the bell rings short, and four or five times out of a day this instrument rings open. By the time our trouble man started out to test out the instrument he would generally locate the trouble in the ringing circuit of the instrument. He changed the ringing coils and got three or four ringing tests and instrument rang O. K., but before he had gone a quarter of a mile from the place we got a report "line rings open." We tested the coils removed from this instrument; they tested O. K. The connections on the outside of the condenser were O. K. Can you help us out on this case of trouble? B. F. R.

The information given in your query is rather incomplete for us to state positively what your trouble might be. We will, however, make a few suggestions which are based upon the data given.

It is improbable that the trouble is in your instrument, as the indications point toward a broken fuse, or a poor connection where your house wire joins the line. This kind of trouble is the most difficult to find, as it appears to come when you are not looking for it and disappears when you are. There may or may not be a reason for this.

Usually about the first thing the average troubleman does when sent upon a case of trouble of this nature is to have the operator ring on the line. If the trouble is only a partial open in the form of a poor connection, the generator current being of a higher voltage and frequency than the usual line current,

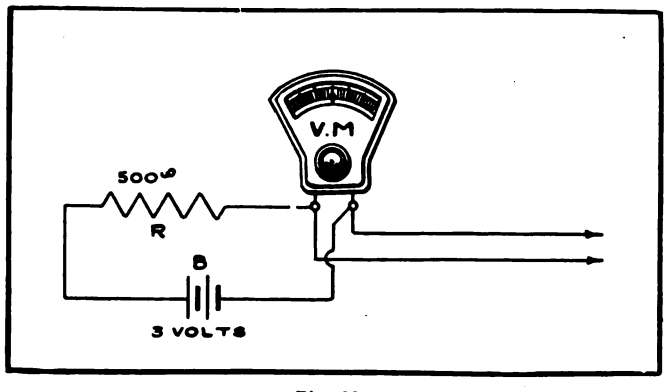

Fig. 881.

tends to fuse the conductors to a certain extent and they remain closed until again disturbed, clearing, to some extent, the trouble.

We would suggest that you take a low reading voltmeter and wire it for testing, as shown in diagram No. 881. In this diagram V indicates the voltmeter, R the 500 ohm resistance, B the battery, which should be about 3 volts, and L the line. Have your troubleman go to the instrument and work from there toward the exchange with a receiver across the line. When he passes the trouble he will cause a deflection of the voltmeter needle. In this way you will have but a small amount of current on your line and will at the same time secure a large deflection. This is a very simple manner of locating the trouble and one much more efficient than that usually adopted by the linemen as stated above.

INDUCTION FROM POWER LEAD.—(882.)

We have a toll line that parallels an electric light power lead for about three miles. The length of this toll line is twelve miles. When we put this toll line up the power line was carrying 220 volts. We transposed our toll line and did away with all the electric light induction, then the power company boosted up their load from 220 to 500 volts—this put our line out of commission at night. Now part of the time this power company carries 220 volts and part of the time 500. When they are using 220 volts our line works. What can we do with this line so it will work perfectly under both of the above conditions? F. T. H. R.

From the description you give of your trouble, it would appear that there must be other influences aside from the change in voltage, as this slight difference would not be so greatly noticed. it may be that the 500 volt machine is grounded while the 220 volt machine is not. We would advise that you be sure your lines are free from all grounds and there is no reason why you cannot clear them.

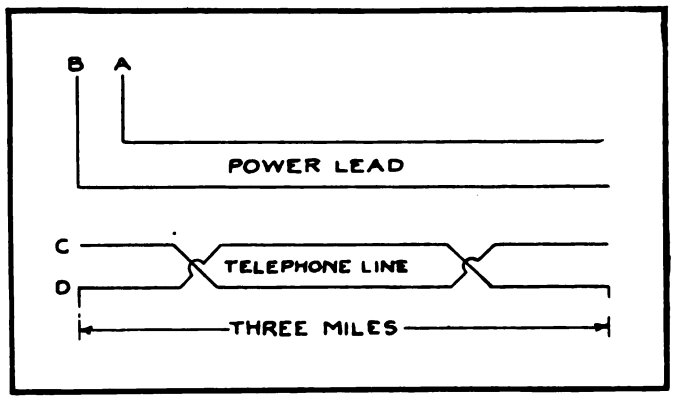

Fig. 882*a*.

In relation to transposing, you state that you have transposed your entire line. We suppose in this you have followed the general form of placing your transpositions a certain distance apart, paying no attention to local conditions. If this is the case you probably have the transposition condition as shown in Fig. 882*a*. A B represents the electric light line, while C D shows the toll line. You can readily see by this that the line C might be more exposed to the inductive influences of the electric light circuit than would the line D. Take your three miles of bad line and make a transposition section of it as shown in Fig. 882*b*. In the centre of the section cut in the transposition shown at T^2.

If this does not clear your trouble, then cut in transpositions T^1 and T^3 half way between T^2 and the ends of the section.

STORAGE CELL ENERGY EFFICIENCY.—(883.)

Kindly explain in an early issue of your valuable paper the meaning of the term "energy efficiency" when applied to storage batteries.

The energy efficiency of a storage cell is the ratio between the value of the energy expended in the charging operation and that obtained when the cell is discharged at any specified rate.

In a lead storage cell, if the surface and quantity of active material be accurately proportioned, and if the discharge be

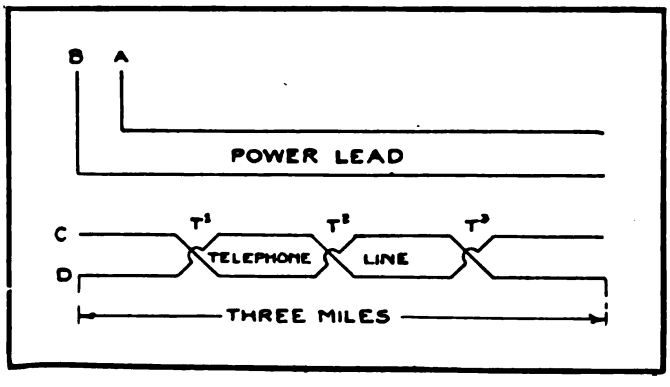

Fig. 882*b*.

commenced immediately after the termination of the charge, then an energy efficiency of as much as 98% may be obtained, provided the rate of discharge is low and well regulated. In practice it is found that low rates of discharge are not economical, and as the energy efficiency always decreases as the rate of discharge increases, it is found that the normal energy efficiency seldom exceeds 90% and averages about 85%.

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FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

SECOND HAND switchboards for sale—2 100 capacity Chicago Telephone Supply Co.; 1 200 capacity and 1 100 capacity Western Telephone Construction; 1 100 capacity Swedish-American; 2 50 capacity and 2 100 capacity Eureka; 1 100 capacity Standard; 3 100 capacity Keystone; 3 200 capacity and 1 100 capacity North. Address Victor Telephone Works, 6583 State St., Chicago, Ill. 817

FOR SALE—Telephone plant, 215 'phones; plant three years old and in good condition; 100 drop switchboard; everything new; a bargain. Write for particulars. Canton Tel. Co., Canton, Kan. 861

$3,000 CASH takes an up-to-date telephone exchange, 100 telephones, earning $150 per month. Address Box 864, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 864

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For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

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WANTED---Continued

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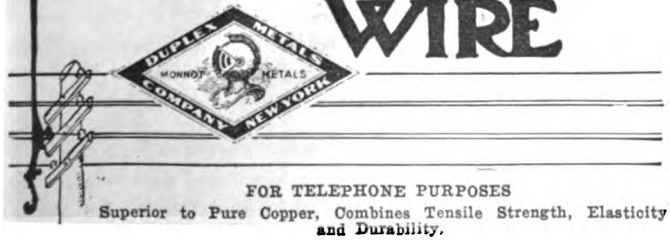
WANTED—Position as superintendent by a man of 26, thoroughly familiar with all branches of the telephone business; at present have charge of all the work on a Bell exchange of 3,500 subscribers. Address Box 857, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 857

WANTED—Position as manager or superintendent of telephone company, Kansas or Missouri preferred. Experienced in all lines of construction, repair and maintenance, switchboards, lines and instruments. Eight years' experience. Best of references. Address, Box 858, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 858

WANTED—Position by competent young man as manager or superintendent of telephone exchange, not over eight hundred subscribers. Six years' experience. Good habits; best reference furnished. Address, Box 859, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 859

OPEN FOR ENGAGEMENT—Construction engineer, American, married, civil engineering education, now employed with a large Bell Telephone Company, wishes position as manager or engineer with smaller company. Expert estimator and capable executive; thoroughly conversant with Development, Transmission, Construction Work and Telephone Exchange Building. Can absolutely produce results. Correspondence solicited. Address Box 862, care AMERICAN TELELPHONE JOURNAL, 100 William St., New York. 862

MONNOT COPPER-CLAD WIRE BETTER AND COSTS LESS



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With the Inventors

WIRE CLAMP.

J. Bowers, Caldwell, N. J., patent (No. 856,512, June 11, 1907).

The wire clamp described in this patent comprises a bolt with a threaded shank into which a slot is cut dividing the shank and extending slightly into the head of the bolt. The wire or conductor which it is desired to clamp is inserted in this shank slot and a washer of slightly flexible material such as fibre or leather is slipped over the bolt after which the nut is screwed down, holding the wire solidly. The object of the resilient washer is to prevent the tearing of the wire which might occur when the edges of the nut were turned upon it.

The inventor also states that this washer, having a tendency to fit around the wire, gives a greater friction surface and thus more readily holds the wire. Corrugations are provided on the lower surface of the nut to engage the face of the washer.

INSULATOR SUPPORT.

C. L. Peirce, Jr., Chicago, patent (No. 856,801, June 11, 1907) assigned to Peirce Specialty Co.

This insulator support consists of a channel bar slotted at one end. The sides of the slot are bent inwardly to form lugs into which the extension pieces of a metal strap may engage. This metal strap is provided with corrugations in such a manner that when the strap is bent around the channel bar support these corrugations form threads which will fit into the threads of the glass insulator. The object of lugs is to hold this threaded device securely in position so that the insulator may not become readily disengaged from the support.

HAND MICRO-TRANSMITTER.

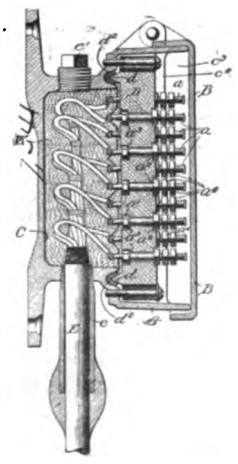
O. F. Falk, Boston, patents (Nos. 855,394 and 855,395, May 28, 1907) and assigned to A. T. & T. Co.

These patents describe construction features of a transmitter and hand micro-telephone in which the transmitter button is supported in a position oblique to the diaphragm, the inventor's idea being to obviate any possibility of the granular carbon in the button dropping away from one of the electrodes during conversation when the transmitter might be on a horizontal plane.

TERMINAL BOX.

S. P. Grace and R. A. L. Snyder, Pittsburg, patent 857,341, June 18, 1907, assigned to W. E. Co.

The cable box described in this patent consists of an iron casing having two chambers, together with a cover which is hinged and bolted to the outer casing. The cable *E* extends up



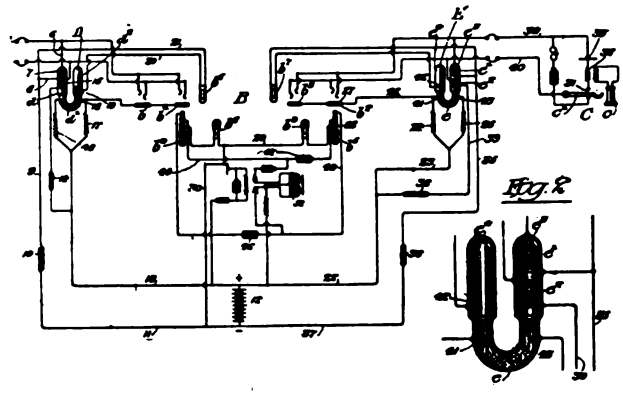
through the nozzle *e* and into the back chamber *C*, where it is distributed and fanned out to the binding posts a^1, a^2, etc. After having been fanned out in this manner the chamber *C* is filled with some suitable compound *F*, which thus effectually seals and renders moisture proof the inner chamber *C*. The nut *e'* serves to further prevent the entrance of moisture to this chamber.

The binding posts before mentioned extend through the insulating plate *D* into the outer chamber C^2, where they are provided with lock nuts for the fastening of the "spider" wires which lead out to the various line wires upon the pole or to the points of distribution.

ELECTRO-THERMAL TELEPHONE SYSTEM.

F. B. Cook and J. G. Nolen, Chicago, patent 856,570, June 11, 1907; said Nolen assignor to said Cook.

The telephone system described in this patent is one in which the circuits are governed and operated by means of an electro-thermal device, as shown in Fig. 2. This device consists of a



sealed glass chamber, "U" shaped, having coiled conductors e^1 and e^2 running through the upper bulb e^3. The operation of the system is dependent upon the heating of these conductors, by current flowing through them, to such an extent that they will heat the gas contained within this portion of the chamber, causing it to expand to such a degree that it will sufficiently move the liquid *e* to complete contact between the conductors 41 and 42, that is, completing the signalling circuit to the exchange. The supervisory lamps b^8 and b^9 are governed by a like device, so that upon the restoration of the receiver upon its hook at the subscriber's station and the closing of the circuit, current will flow in such a manner as to cause the operation of these supervisory signals.

MULTIPLEX TELEPHONY.

M. LeBlanc, Paris, France, patent 857,079, June 18, 1907, assigned to Westinghouse Electric & Mfg. Co.

The system described in this patent purports to be an improvement over patents Nos. 596,017 and 628,246, granted Hutin & LeBlanc, which comprehend the use of an alternating current for multiplex telephony irrespective of the number of its phases and which necessitate the use of multiphase alternating current requiring two or more line wires and a return circuit.

The object of the inventor is to provide a system for multiplex telephony in which no more than a single line wire and return circuit is necessary and in which single phase alternating currents of very high frequency are employed.

WIRELESS TELEPHONE.

F. J. McCarty, deceased, by H. A. McCarty, administrator, patent 857,530, June 18, 1907; and assigned to McCarty Wireless Telephone Co., San Francisco, Cal.

This patent covers the combination of a transmitter having two diaphragms, one controlling a double make and break contact and the other of the ordinary microphonic type, with an induction coil having two primaries and one secondary, with certain described auxiliary apparatus and circuit arrangements. In circuit with the secondary is a spark gap with one terminal grounded and the other connected to an aerial for the purpose of sending out electromagnetic waves. The whole device is designed for the transmission of speech without wires.

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DIVIDENDS GUARANTEED

INVESTORS: The Independent Telephone Company having the most modern equipment, and one that gives to the subscriber better service than that given by the old Company that has the advantages of from ten to twenty years' operations, can guarantee satisfactory earnings and dividends.

The Wire & Telephone Company of America, of Rome, N. Y., provides the foundation and guarantees results upon which the operating Company makes its guarantee to the investor.

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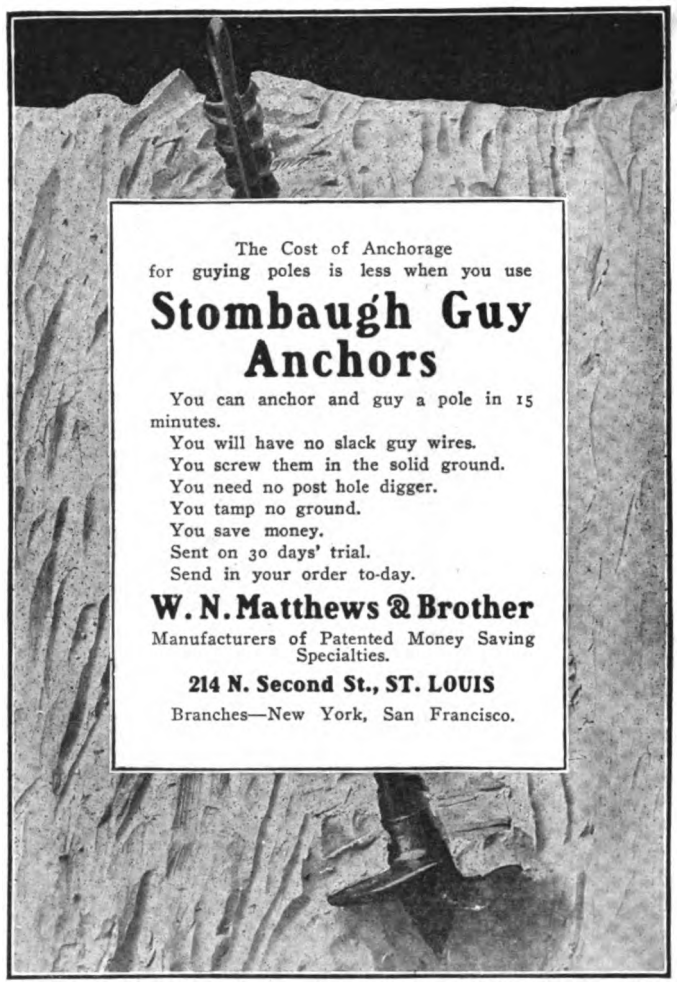
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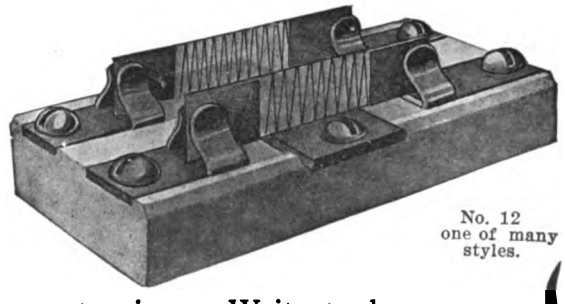
If you wait until the lightning has done its damage and then place better protection.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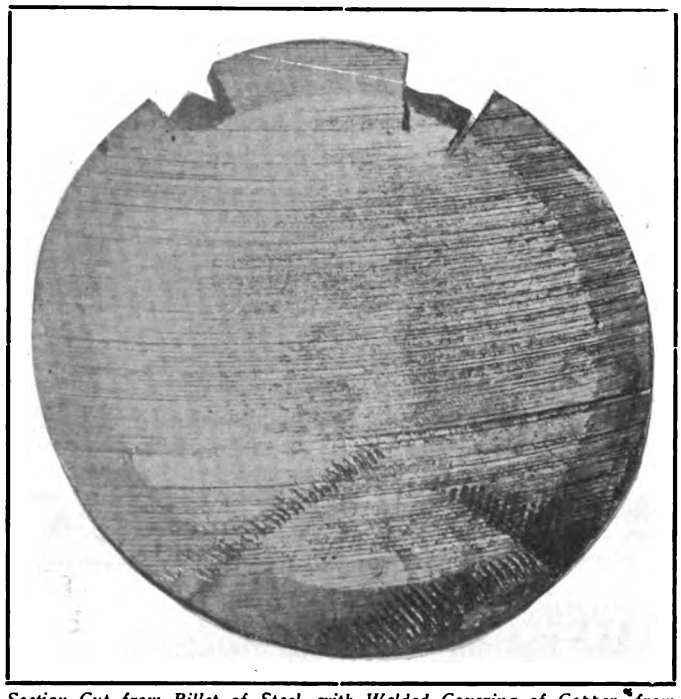
News for the Buyers

ECONOMIES FROM THE USE OF A NEW TYPE OF WIRE.

MONNOT copper clad steel wire is drawn from a steel billet having firmly welded to its surface an outer covering of copper. As this billet is drawn into wire, both the steel core and copper covering are simultaneously drawn out and reduced in diameter, it being possible, so it is claimed by the manufacturers, to bring the two down to any of the standard gauges used in telephone work and still maintain the welded joint between them in its original perfection. This process makes a wire which has a steel core to give strength, surrounded by a copper covering which gives a high electrical conductivity.

Copper wire has been used in telephone work on account of its ability to resist corrosion and its high conductivity. This first quality is possessed in full by the Monnot wire and the percentage of conductivity, as compared with that of pure copper wire, may be made sufficiently high for all practical purposes, by having a copper covering of the proper thickness. The question of economy enters here as a determining factor and is said to show advantages for the Monnot wire for aerial lines.

In regard to the durability of Monnot wire, it is not subject to the disadvantage of stretching to the breaking point under a comparatively low tension as is hard drawn copper wire, nor is it liable to break when slightly kinked or scratched on the surface. These points and others are tersely summed up by the company which sells it in the two following sentences: "The steel core gives high tensile strength and elasticity. The outside layer gives high conductivity and perfect protection against corrosion."



Section Cut from Billet of Steel, with Welded Covering of Copper, from which Monnot Wire is Drawn. Notches Show Where Ineffectual Attempts Have Been Made to Break the Weld.

With regard to the degree of economy which may be obtained from the use of copper clad wires, the consideration of this question in relation to distributing wire presented by Mr. S. P. Grace in his recent paper before the American Institute of Electrical Engineers, is of special interest. This question is discussed on page 320 of AMERICAN TELEPHONE JOURNAL, issue of May 18, 1907, in which appeared a portion of Mr. Grace's Institute paper. Here it is shown that a No. 17 copper clad wire can be substituted for No. 14 hard drawn copper wire. This No. 17 wire has the same tensile strength as the larger copper wire and its conductivity is sufficient for all practical purposes, as it is used to terminate a line through No. 19 or No. 22 gauge cable. It will be observed from this that a saving is effected in two separate ways; in the first place because the copper clad wire costs less per pound than copper wire, and in the second place because a given number of pounds will make a much longer section of line, as a smaller wire may be used. Further than this, if the wire is covered the cost of insulation is less for the copper clad wire than for an all copper wire of a size sufficiently larger to have an equivalent tensile strength.

Duplex Metals Company, 208 Fifth avenue, New York City, which has secured exclusive American rights for this process, has issued a booklet containing much valuable information about the new wire. It may be obtained by all interested managers and engineers of telephone companies.

EXPERT INSTRUCTIONS IN MAKING CABLE SPLICES.

ONE of the most interesting exhibits at the International Independent Telephone Convention was a practical demonstration of the Hargis Cable Splicing Joint. This device is designed to do away with the old-fashioned wiped sleeve. The manufacturers say that it was shown at this exhibit that anybody who is able to make tin stick to brass is able to make an absolute moisture proof joint by means of the Hargis Cable Splicing Joint. Demonstrations were given to the delegates every half hour by Mr. O. R. Johann.

These demonstrations proved so successful in convincing the telephone men present that this novel device is not only practical but very economical, that the manufacturers have decided to send Mr. Johann throughout the country to show telephone managers how it can be used to advantage by them and explain its various points of merit. The manufacturers believe that a great number of telephone companies who cannot afford to keep on hand an expert cable splicer will be glad of the assistance of Mr. Johann in teaching their regular men how to wipe a joint properly and make other points clear that are necessary to be known, in order to have the most economical distribution by means of lead cables.

Mr. Johann will cover the state of Iowa first. The manufacturers would like to have the manager of any company that wishes his services write, stating when it will be convenient to see Mr. Johann, and have him demonstrate the value of the Hargis Splicing Joint and teach their men how to use it.

Mr. Johann will install a large quantity of Hargis cable splicing joints for the Martin Telephone Company, of Webster City, Ia., between the 20th of June and the 1st of July. Mr. Ed. Martin believes that this device affords a much more economical distribution than can be had by the use of the old horizontal joint, and will install them on all his underground work to take the place of the regular horizontal sleeves he now has in place.

Any one who is interested in having Mr. Johann call should write to W. N. Matthews & Bro., 214 North 2d street, St. Louis, who are the manufacturers of this device.

H. P. DIDRIKSEN TAKES CHARGE OF "LONG DISTANCE" SALES.

MR. H. P. DIDRIKSEN has recently assumed the duties of sales manager of the Long Distance Telephone Manufacturing Company, of South Bend, Ind. During his connection with the telephone business, which began about six years ago in Chicago, Mr. Didriksen has become well known to telephone men in all parts of the country. He was for a time associated with the Eureka Electric Company, and for the past three years has been with the Wesco Supply Company, St. Louis, in charge of the telephone and advertising departments.

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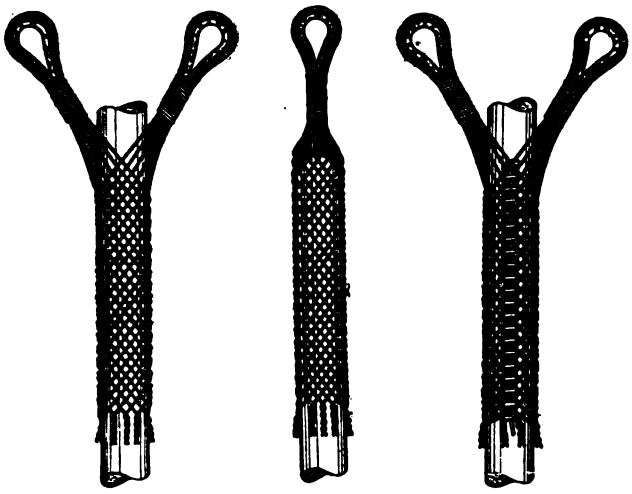
MAILED US TO-DAY, will bring you a sample of the greatest labor and money saving device possible to secure for your cable department.

A UNIVERSAL CABLE GRIP



DOUBLE EYE. SINGLE EYE. SPLIT GRIP.

They pull cable in or out of ducts, pull up slack, pull out a cable that is broken flush with the mouth of the duct and do various other things as well. No injury to the sheathing, however.

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Compiled from the most valuable instruction papers of the American School of Correspondence. The success which the School has had in teaching thousands of electricians is in itself the best possible guarantee for the work. The volumes contain the essence of the most successful methods yet devised for the education of the busy workman. The rules and formulae are in every case presented in a very simple manner, and every principle is illustrated with special diagrams and practical examples.

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AMERICAN SCHOOL OF CORRESPONDENCE
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THE STATIC CHARGE

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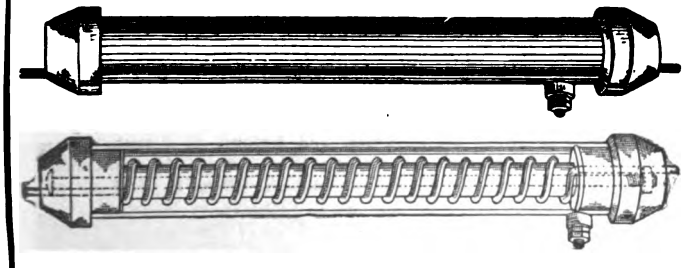
Sky Rocket Arresters



The fifty inches of coiled wire present a discharge *surface* that assures at all times a line free from the *dangers* due to disruptive discharges. Pay for themselves every electrical storm.

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Are made of specially prepared, hard drawn, steel wire. This assures flexibility and durability.

¶ And owing to the high resistance of the steel wire, a winding of pure copper wire is applied to reduce this high resistance. This assures good conductivity.

¶ Each conductor has a triple insulation, the first consisting of a serving of silk, the second of a serving of cotton and the third of a braiding of waxed cotton. These assure perfect insulation.

¶ And these features, together with our new prices, which are in your favor, assure satisfaction to the purchaser.

It is to your interest to write us to-day

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Good News—and It's All New

NEW COMPANIES.

CHEYENNE WELLS, COL.—Articles of incorporation have been filed by the Cheyenne County Telephone Company, which is to have its principal place of business at this city. It has a capital stock of $3,000, and the incorporators are J. W. P. Love, H. H. Lotz, H. Y. Tarwater and others.

FULTON, IND.—The Germany Mutual Telephone Company, of Fulton, has been incorporated with a capital stock of $1,000.

MENLO, IA.—The Jefferson Mutual Telephone Company, whose principal place of business is to be at the Jefferson Center School House, in Adair County, Ia. (P. O. address Menlo, Ia.), has been incorporated with a capital stock of $10,000, divided into shares of $25.00 each. Its intention is to acquire the system owned and operated by the Jefferson Township Mutual Telephone Company, which is not incorporated, and to construct lines throughout Adair and other counties. The incorporators of the new company are M. R. Cline, L. E. Smith and C. Wilson.

RED LODGE, MONT.—The Clarke's Fork Farmers' Telephone Company, of Red Lodge, has been incorporated with a capital stock of $10,000.

JERSEY CITY, N. J.—The Dakota Home Telephone Company has been incorporated under the laws of New Jersey for the purpose of constructing and operating telephone lines. The capital stock is placed at $300,000, and those interested in the new corporation are Charles King, G. H. Russell and Jacob B. Mersele, all of 243 Washington street, Jersey City.

LONG EDDY, N. Y.—Articles of incorporation have been filed by the Delaware and Sullivan Telephone and Telegraph Company, of Long Eddy, Sullivan County. It has an authorized capital stock of $10,000, and the directors are J. T. Male, H. W. McKoon, A. M. Chandler, of Long Eddy.

BERLIN CENTER, O.—The Berlin Center Telephone Company, which has a capital stock of $10,000, is one of the newly organized Independent companies. The incorporators are W. K. Hughes, W. H. Kale, S. S. Best, H. J. Woolf, G. W. Maskrey, G. B. Shrabler, K. James, H. Kaiser and George C. Eckes. The company will construct and operate telephone lines in Berlin, Jackson, Ellsworth, Canfield and Milton townships.

SYLVANIA, O.—Articles of incorporation have been filed by the Citizens' Telephone Company, of Sylvania, Lucas Co. It has an authorized capital stock of $10,000, and the incorporators are F. J. Maisen, J. G. Lauer, R. J. Skinner, Anthony Lauer and A. J. Houghton.

UNION FURNACE, O.—The New Plymouth Telephone Company, of Union Furnace, has been incorporated with a capital stock of $1,000, by W. P. Miller and others.

MANITOU, OKLA.—The Holton Union Telephone Company, of Manitou, with a capital stock of $640, has filed articles of incorporation. Among the incorporators are P. P. Barlow, A. T. Fryer and J. N. Montgomery.

SPRING HILL, TENN.—A charter has been granted to the Citizens' Telephone Company of Maury County, whose intention it is to build telephone lines from Jones Valley to Spring Hill. Its capital stock is placed at $50,000, and the incorporators are J. L. Hutton, J. A. Smiser, R. C. Church, Flem Thomas and O. J. Porter.

GRAND SALINE, TEXAS.—The Farmers' Mutual Independent Telephone Company, of Grand Saline, has been incorporated with a capital stock of $5,000. Among those interested in the new company are M. E. Davis, V. T. Davis, J. J. Palmer and J. J. Cameron.

RANDOLPH, UTAH.—Articles of incorporation have been filed by the Utah & Wyoming Independent Telephone Company, whose intention it is to construct and operate a system in Rich county. The capital stock is given at $10,000, and the following officers have been elected: State Senator Wesley K. Walton, president; Charles W. Walton, secretary; George Spencer, managing director.

WATERTOWN, WIS.—A new telephone company to be known as the Watertown Telephone Company has been organized at this city with a capital stock of $15,000. It is its intention to build rural lines into the surrounding country, and the incorporators are Oscar C. Wertheimer, J. F. Prentiss and W. H. Woodard.

EVANSTON, WYO.—The Hilliard Telephone Company has been organized and the following officers elected: Chas. Stone, president; Thomas Blyth, Jr., secretary and treasurer; R. M. Lewis, general manager. Directors are J. E. Austin, Job C. Goodman, Philip Myers, Thos. Blyth, Jr., and Charles Stone. The new company contemplates the erection of lines from Evanston through the upper Bear River Valley to Mill Creek, Hilliard and as far as Moslander.

DACRE, ONT., CAN.—Articles of incorporation have been filed by the Brougham & Gratton Telephone Company, Ltd., of Dacre, Renfrew County, Ont., Can. The capital stock is given at $5,000, and the following provisional directors have been named: Joseph Legree, Philip Bradley, of the Township of Brougham, Robert Steele, John Livingston and Wm. Achel Hurd.

SOMBRA, ONT., CAN.—A Farmers Telephone Company has been organized whose purpose it is to erect a telephone line from Sombra to the Sydenham River, with a central office at Sombra.

FRANCHISES.

WALDRON, ARK.—Application for a franchise at this city has been made by the Citizens Telephone Company.

CLEVES, O.—The Fitzsimmons Telephone Company has been granted a franchise at this city. It has also been given permission to install a telephone system in the village of Oakley, a suburb of Cincinnati, where the installation of an exchange will be commenced at once, and has made application for similar privileges at North Bend.

MIDDLETOWN, O.—Application for a franchise to establish an Independent telephone system in Middletown has been made by W. S. Harlan and others.

HOUSTON, TEXAS.—The Automatic Telephone Company has filed an application for a franchise with the city council.

BREMERTON, WASH.—A franchise has been granted the Paulsbo Rural Telephone Company for the construction of lines in Kitsap county.

FINANCIAL.

LEONARDSVILLE, N. Y.—The capital stock of the Leonardsville Telephone Company has been increased to $2,000, and arrangements are being considered for the extension of the company's lines to West Edmeston and other places.

COLUMBUS, O.—Its regular quarterly dividend of 1½ per cent. on its preferred stock, payable July 1st, has been declared by the Columbus Citizens' Telephone Company. This dividend is the first on the new issue of $250,000 of preferred stock, which makes a total issue of preferred of $750,000.

CRESTLINE, O.—The Crestline Local Telephone Company, of Crestline, has increased its capital stock from $50,000 to $75,000.

JOHNSTOWN, O.—The capital stock of the Johnstown and Croton Telephone Company has been increased from $50,000 to $80,000.

ELECTIONS.

REDDICK, ILL.—The following directors were elected at a recent meeting of the Reddick Mutual Telephone Company: R. L. Goll, F. L. Reike, John Fritz, Geo. Weimer, T. F. Hollerman, James Reilly, Walter Hendrix, R. D. Shelly, Geo. Van Vleet, Samuel Hunt and James Lonergan.

SHENANDOAH, IOWA.—The following directors have been elected by the Independent Mutual Telephone Company, of this city: Levi Baker, D. E. Bute, J. H. Teachout, Cass Nordstrom and A. W. Murphy.

DEXTER, MINN.—At the annual meeting of the Farmers' Telephone Company the following officers were elected: President, B. F. Tanner; vice-president, Henry Weber; secretary, R. Rahilly; treasurer, O. J. Dickens.

FAIRMONT, MINN.—The officers of the Iowa Lake Telephone Company are as follows: President, Chas. Watts; vice president, Wm. Simpson; secretary, R. R. Livingston; treasurer, E. J. Edwards.

LIVINGSTON MANOR, N. Y.—At a recent meeting of the Livingston Manor and Beaverkill Telephone Company the following officers were elected: President, J. G. Stevens; vice-president, W. R. Woolsey; secretary, Aaron Ackerly; treasurer, J. G. Davidson; directors, J. G. Davidson, W. R. Woolsey, Aaron Ackerly, J. D. Stevens, Edward Sprague, F. W. Hartig, R. J. Hoag.

HUNTSVILLE, TEXAS.—The directors of the newly organized Central Texas Telephone Company are A. B. Foster, Ben H. Powell and Dr. J. P. Hendricks, of Huntsville; M. E. Foster and Norman G. Kittrell, Jr., of Houston, and N. B. Huston, of Madisonville. Among the stockholders in addition to the above are W. W. Addickes, S. Gibbs, H. F. Estill and Dr. E. N. Angier, of Huntsville, and W. E. Richards, of Houston.

STRAFFORD, VT.—The newly elected officers of the Strafford Co-operative Telephone Company are: President, S. B. Buell; vice-president, Dr. I. L. Nowlan; secretary, H. C. Gilkey; treasurer, A. L. Judd.

FREDERICKSBURG, VA.—The following officers have been named by the Upper Rappahannock Telephone Company: President, Robert Beverley; vice-presidents, E. J. Smith, H. L. Baylor, A. F. Turner; secretary, C. B. Conway; treasurer, Dr. C. U. Gravatt.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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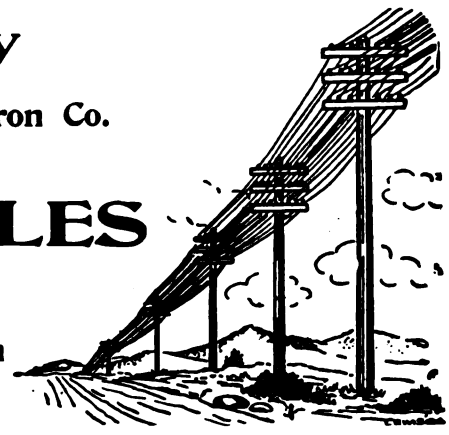

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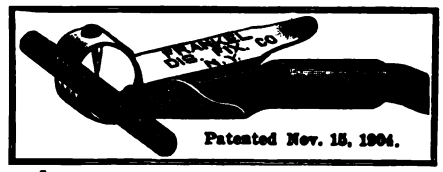

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Good News—And It's All New

COMBINATIONS.

GREENFIELD, IND.—The Westland, Blue River and Carthage Telephone Companies have been consolidated, and will be conducted under one management. Many improvements in the system are to be made.

WINAMAC, IND.—The Winona Telephone Company, which owns exchanges at Winamac, Knox, Plymouth, Kewanna, Hamlet, Grass Creek and Monterey, has acquired the Plymouth Telephone Company's exchange, which has toll lines connecting with South Bend, Argos, Bourbon, Bremen and Etna Green. The owners of the Winona company are A. B. Diggs, S. R. Tomlinson, of Winamac, and W. S. Daniels, of Knox, Ind. It is understood that the consideration was $30,000.

HUNTSVILLE, TEXAS.—The Central Texas Telephone Company, of Huntsville, has acquired a number of local telephone exchanges, including those at Teague, Huntsville, Madisonville, Navasota, Anderson, Iola, Zulch, Normange, Bedias, Shiro, Richards and nine other towns. The merged companies will be operated under the management of the Central Texas Telephone Company in opposition to the Bell company.

MISCELLANEOUS.

DECATUR, ILL.—The Macon County Telephone Company has been reorganized with a capital stock of $250,000, which may be increased to $500,000. It is the intention of the company to make the plant at Decatur one of the most modern and best equipped in the country, and it is estimated that thousands of dollars will be spent in the work.

SULLIVAN, ILL.—The proposed absorption of the Sullivan Telephone Exchange by the Mutual Telephone Company has been effected, the consideration being $13,800.

CASS CITY, MICH.—Under a provision made by the city council some little time ago, Cass City has acquired the local telephone system formerly owned by the Cass City Telephone Company.

MORRILL, MINN.—It is the intention of the Morrill Rural Telephone Company to take over about thirty-three miles of new line in the vicinity of Ramey.

NEVERSINK, N. Y.—The telephone line running from Loch Sheldrake to Hurleyville, formerly owned by Morgan Divine, has become the property of the Neversink Telephone Company.

GRANGER, TEXAS.—The Granger Telephone Company has passed from the hands of its former owner, H. C. Cooper, into the possession of Messrs. A. R. Lawrence and C. W. Wilson.

HASKELL, TEXAS.—The Haskell Telephone Company, at Haskell, has been acquired by A. J. Combs of Moweaqua, Ill., the consideration being $38,000. The plant includes three hundred miles of toll lines and seven exchanges.

SAN ANTONIO, TEXAS.—The lines of the Home Telephone Company were quite badly damaged during a recent storm at this city.

MORSESLINE, VT.—The telephone line between St. Armand, Que., and Stanbridge, owned by the Citizens' Telephone Company, has been purchased by J. M. Hill, who is building a line from Morsesline, Vt., to St. Armand. It is Mr. Hill's intention to extend the line through to Bedford, giving connection with Eastern townships.

PORTAGE, WIS.—The Portage Telephone Company has taken over all of the Colonius lines except the line from Packwaukee to Montello and the Montello exchange.

PERSONAL.

E. M. CARLISLE has recently taken charge of the exchange of East Tennessee Telephone Company at Lawrenceburg, Ky.

J. A. CONE has been promoted from the management of the exchange at Omro to the Appleton office of the Wisconsin Telephone Company.

W. E. KILMARTIN has recently taken charge of the two exchanges of the Central Union Telephone Company at Mendota and Princeton, Ill.

H. W. McWAYNE, who was formerly wire chief at the Marinette exchange of the Wisconsin Telephone Company, has recently assumed the position of manager at the exchange at Kaukauna.

C. S. MAESER has been appointed manager of the exchange of the Rocky Mountain Bell Telephone Company at Great Falls, Mont.

H. A. THOMPSON succeeds Mr. J. A. Cone as manager of the Omro exchange of the Wisconsin Telephone Company at Omro, Wis.

With the Builders

COACHELLA, CAL.—Many extensions in its lines in this city are being made by the Home Telephone Company.

POMONA, CAL.—An agreement has been entered into by the Home Telephone Company of this city and United States Long Distance Telephone Company for the improvement of long distance service to Pomona. An entire additional new line is being built from Los Angeles to Pomona.

MINIDOKA, IDAHO.—About thirty-nine miles of line are to be constructed by the Government in and about Minidoka.

CANTON, ILL.—Among the improvements planned by the Canton Home Telephone Company are the re-equipment of its central office, and the building of new lines to neighboring towns.

CHAMPAIGN, ILL.—Work on the new system of the Home Telephone Company in this city is being carried on. It will have a capacity of 2,000 subscribers.

MARION, ILL.—Many improvements and additions to its plant in Marion are being undertaken by the Ohio and Mississippi Valley Telephone Company.

REDDICK, ILL.—Many improvements and extensions in its system are contemplated by the Reddick Mutual Telephone Company.

MARION, IND.—The switchboard capacity of the United States Telephone Company at this city is to be increased.

CENTERVILLE, IA.—New lines through Centerville are being erected by the Boone County Telephone Company.

CAMPBELLSVILLE, KY.—The Campbellsville Telephone Company is rebuilding its exchange, installing a new switchboard and otherwise improving its system. When the work has been completed its plant will be a thoroughly up-to-date one in every particular.

GRAY, ME.—A new exchange is being installed at this city by the Pine Tree Telephone Company.

AURORA, MINN.—Work on the installation of its exchange is now under way by the Aurora Telephone Company.

OWATONNA, MINN.—Many improvements in its plant at Owatonna are to be made by the Straight River Telephone Company.

CASSVILLE, MO.—The Barry County Mutual Telephone Company, whose intention it is to install an exchange at this city, expects also to build a line to Crane.

HOLDEN, MO.—It is the intention of the Holden Telephone Company to install a new switchboard at the cross roads between Pittsville and Columbus to take care of its increasing business.

LIVINGSTON MANOR, N. Y.—A new line from Lew Beach to Livingston Manor is to be constructed by the Livingston Manor and Beaverkill Telephone Company.

OXFORD, N. Y.—It is the intention of the Unadilla Valley Telephone Company to build a trunk line to connect with the Oxford Valley Telephone Company at Lyon Brook.

TOLEDO, OREGON.—Among the many recent improvements of the Yaquina Bay Mutual Telephone Company may be mentioned the installation of new switchboards at Toledo and Newport. The company now has connection with most of the valley towns and with Portland.

JONESTOWN, PA.—Many extensions in its system have been made by the American Union Telephone Company, among them being a line from Jonestown to Lickdale, Bordner's Store and Inwood in Union Township. A line has also been built from Colebrook to Lawn.

TOPTON, PA.—An additional line between this city and Kutztown has been erected by the Consolidated Telephone Company.

MIDLAND, S. D.—The Great Western Telephone Company, which has comleted a line to Midland, now has under consideration the construction of lines from Midland north through Ottumwa and Manila to Leslie on the Cheyenne river.

GALLATIN, TENN.—The Home Telephone Company, which operates in Westmoreland, and which has been granted a franchise in this city, expects to install a local exchange very shortly.

DANBY, VT.—A line from Danby to Pawlet is being erected by the Rutland County Telegraph and Telephone Company.

TACOMA, WASH.—About $30,000 is being expended by the Home Telephone Company in the erection of a sub-station in this city.

PARKERSBURG, W. VA.—Work is to commence at once on the long distance lines which are to give the West Virginia Western Telephone Company connections with Pittsburg.

ARCADIA, WIS.—It is the intention of the Farmers' Telephone Company to build a number of rural lines.

HERTEL, WIS.—Work on a line from Hertel to Shell Lake has been commenced by the Hertel-Shell Lake Telephone Company.

NEWARK, WIS.—The Orfordville Telephone Company is building a line to Newark.

LUSK, WYO.—Among the improvements being made by the Kirtley Telephone Company, of Kirtley, is the erection of a line to Lusk.

UNDERGROUND.

SPRINGFIELD, MO.—The New Home Telephone Company, which is to commence the construction of its plant, contemplates placing many wires underground.

ST. JOSEPH, MO.—Application has been made by the Citizens Telephone Company to the Board of Public Works for permission to lay its wires in conduits. It is estimated that the company will expend about $1,000,000 in improvements.

HELENA, MONT.—Work on the conduit system of the Independent Telephone Company is to be commenced.

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The American Telephone Journal

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VOLUME XVI. SATURDAY, JULY 13, 1907. NUMBER 2.

The Lake Constance Loaded Submarine Cable

By Dr. Alfred Gradenwitz.

WHILE there is no difficulty in associating Pupin coils with the conductors in ordinary cables laid out underground, as confirmed by many working installations, in the case of submarine cables there were considerable difficulties to be anticipated in arranging the coils. These, of course, had to be fitted into the cable before it could be laid. In order to afford a practical demonstration of its ability to surmount these difficulties in the case of submarine cables, Messrs. Siemens & Halske gladly accepted the offer recently made of laying out a Pupin cable between Friedrichshafen and Romanshorn through the Lake of Constance. The length of this cable is about 12 kilometres.

That the problem was far from simple was soon proved by the engineers of the company. Many special circumstances affected both the design and method of placing the cable. Among these it may be mentioned that the maximum depth of the lake on the path of the cable was relatively great; the number of telephone circuits was fixed at 7; and the cable had to be conveyed by rail to the lake, then loaded on the boat from the cars. On account of the existing telegraph cable between Friedrichshafen and Romanshorn, care had to be taken to lay out the telephone cable at a certain distance from the former. The bottom of the lake, though reached at different depths on the respective sides, gradually drops towards a deep channel traversing nearly the whole lake in a longitudinal direction. The maximum depth of this channel is 250 M., which is practically reached by the cable.

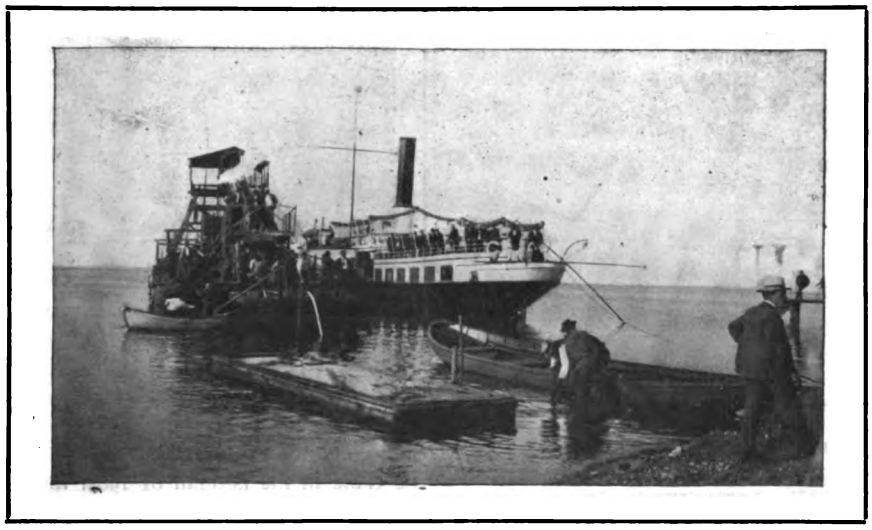

Fig. 1. Laying the loaded submarine cable in Lake Constance—the start from the Friedrichshafen shore.

Now, at a depth of 250 M. the water pressure works out at about 25 atmospheres, and the cable to be placed on the bottom must be able to oppose a constant and effective resistance to this pressure. As may be anticipated, and as confirmed by actual tests, a pressure of 25 atmospheres continued for some length of time will produce on many materials practically the same effect as a higher pressure lasting for only a short time. The preliminary tests, for which only a short time was available, had therefore to be made at pressures superior to 25 atmospheres, and as a 6-fold factor of safety was found to be sufficient, even in the case of short tests, all definite tests were made at a pressure of 150 atmospheres....

It was recognized that the pressure could not be dealt with by the wire strands alone. The lead sleeve had accordingly to be given sufficient strength to prevent the strands from being compressed. This additional strength, on the other hand, could not be ensured by increasing the thickness of the lead sleeve without unduly increasing expenses, although normal thicknesses of say 5 MM. as a maximum did not afford sufficient protection against the maximum water pressure. The diameter of the strands, being in the present case about 2.5 MM., obviously played an important part in connection with these experiments.

Hollow sleeves of pure lead afford the lowest resistance to pressure, while those consisting of lead with a certain percentage of tin were found to be only little more resistant. If the lead sleeve contained the cable strands, its resistance was added to only immaterially. In fact, in the case of sufficient pressure all lead sleeves and cable strands were found to be compressed, deformation beginning at the spots of smallest resistance and eventually extending all over the length of the sample. Time was found to be an important factor, and those sleeves which for say half an hour could resist a certain pressure would be deformed completely after two hours. In the case of a pressure of 50 atmospheres all the samples of this kind would be deformed.

From the tests made along these lines it was inferred that ordinary cables are in no way suitable for the present case. Means had therefore to be provided for increasing the rigidity and strength of the lead sleeve without interfering with the flexibility of the cable. This task was accomplished by surrounding the cable strands with a spun steel wire coil, above which the lead sleeve was forced. The diameter of the steel wire obviously played an important part, and a wire 2 MM. in thickness was definitely chosen. Cables of this type, when tested under a pressure of 150 atmospheres, did not show any deformation in the case of prolonged tests.

While wires of different thickness, according to the varying depth of the lake, would theoretically have been most suitable, a uniform thickness of steel wire was adopted for the whole length of cable, for the sake of simplicity and because there was no time available for continuing these experiments. The shore

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cables, containing a double armature, were made of the same type, while the land cable was made of the ordinary type without protective steel coils.

Fig. 2 shows the three types of cable, namely, the land, lake and shore cables respectively. The cable seen in the middle is the lake cable proper, which carries an armor of 32 iron wires,

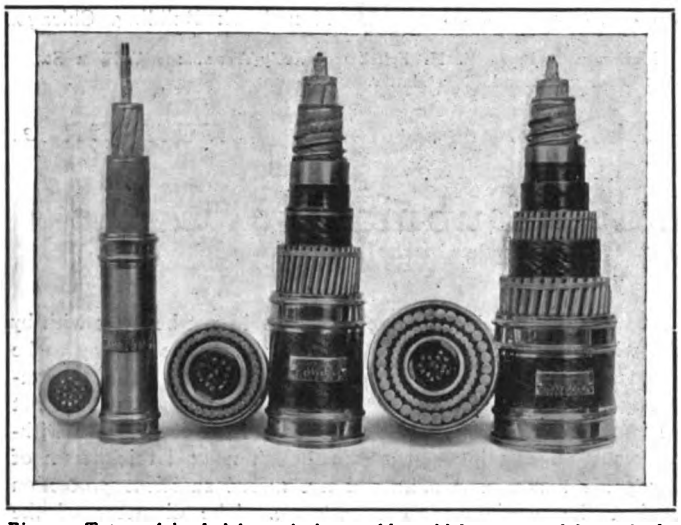

Fig. 2. Types of land, lake and shore cables which were used beneath the waters of Lake Constance.

3.75 MM. in diameter. To the right is seen the shore cable, which is provided with a double armor, the internal armor being the same as in the lake cable, while the outside armor, separated from the former by an intermediary jute cushion, comprises 30 iron wires, 5.4 MM. in thickness. The land cable visible on the left side of the figure is an ordinary bare lead-sheathed cable.

According to contracts, the lake cable had to be provided, at distances of 500 metres apart, with means for preventing any water which might penetrate through a defect from advancing beyond a given point. This was arranged in connection with the locating of Pupin coils. As the latter had a larger diameter than the cable strands, the lead sleeve had obviously to be provided with an enlargement at the coils. However, these points, like the cable itself, had to resist to the maximum pressure of 25 atmospheres, and samples of these enlarged portions were likewise constructed and submitted to a continued pressure of 50 atmospheres, which was readily dealt with by the final samples.

The arrangement of the coil sections is as follows: The cylindrical part contains the annular coils, through the hollow interior of which any conductors not belonging to the coil are allowed to pass, the several coils being separated from each other by cushions. A transition from the cylindrical part of the coil section to the cylindrical part of the cable is effected by a conical portion, which at the same time constitutes the limit beyond

Fig. 3. Method of making up by hand the special sections of submarine cable for retaining Pupin loading coils.

which no water, in the case of a defect, should penetrate. As there are two such conical parts on both sides of the cylindrical portion of the coil section, a water lock is effected on both sides, the conical part (the lead sleeve of which is reinforced by a conical steel wire spiral) being filled in entirely, while the ordinary hygroscopic paper sleeve is replaced by an india rubber sleeve. Tests have shown this arrangement to be exceedingly reliable, as in the case of a pressure of 75 atmospheres some drops of water would penetrate through the conical piece only after some length of time, while no water was found to pass in the case of smaller pressures.

The coils are fitted at distances of 1,000 metres in each of the pairs, while there are coil sections alternately for a set of 3 and one of 4 double conductors, respectively, at each 500 metres. The coil sections thus simultaneously afford a water lock. They are fitted between armored cable sections of 500 metres length, the armor being applied at these points under a mechanical traction of 2,000 kilograms, while the wires were guided and tied by hand, as shown in Fig. 3.

Though the lake cable is only about 12 kilometres in length, a regular cable-laying machine, such as used in connection with submarine cables, had to be used on account of the considerable weight of the cable, and the normal traction of about 2,000 kilograms to be accounted for in laying the cable at the deepest spots of about 250 metres, which normal traction in the case of any disturbance was obviously liable to increase considerably. No such tractive forces could be controlled with ordinary friction brakes.

A ferry boat used for conveying railway cars (each of which accommodates eight cars) was found to afford sufficient space and buoyancy to carry the whole of the machine in addition to the cable, about 110 tons in weight, the cable being arranged on deck at the front of the boat in a ring about 9

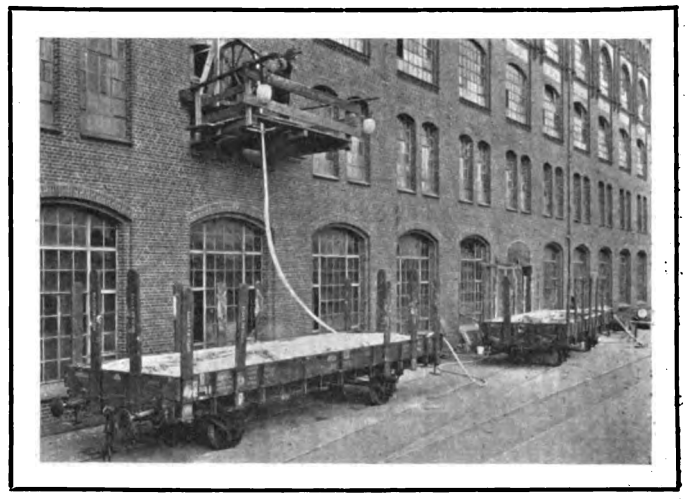

Fig. 4. Loading the cable direct from factory into train which is to carry it to the shores of Lake Constance.

metres in diameter, while the cable-paying machine was installed at the rear end.

In connection with a preliminary unsuccessful attempt to lay the cable in the autumn of 1905, there was used the old cable-paying machine of Messrs. Siemens Bros.' well-known cable ship "Faraday." The diameter of the drum of this machine was only 170 centimetres, and the cable had to be wound, with its reinforced portions (coil sections and water locks), around this drum. The diameter of the drum was found to be somewhat too small to allow it to take these reinforcements.

When the cable was laid out last summer there was accordingly used a special cable-paying machine of larger drum diameter, viz.: 240 centimetres. This machine had been designed by Mr. Weiss, a specialist in this line, and late engineer of Siemens Bros., and constructed by Messrs. Fr. Gebauer, of Berlin. This machine, which has given excellent results, is of the same general construction as an ordinary cable-paying machine, its unusual appearance being due to the fact that the diameter of the pulley around which the cable is wound has been increased considerably. In order to prevent any disturbance in the smooth operation of the machine as the reinforced portions of the cable were wound off, guiding devices were fitted in front of the pulley. The dynamometer pulley, serving to maintain the

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traction corresponding to the actual depth, was likewise given a larger diameter, as was the winding pulley fitted at the stern of the vessel. Fig. 7 shows the arrangement of the whole of the machinery.

As the cable laying was absolutely equivalent to the paying out of a submarine cable in the sea, the same precautions had to be taken as in such cases. The cable was, for instance, to be carefully guided on its way until reaching the water. This was accomplished by means of a scaffolding, on the top of which a guiding pulley was installed, and after passing the latter, the cable was allowed to slide in a chute toward the pulley of the cable-paying machine.

The cable had to be carefully wound up on board, in order to be able to smoothly unwind at a fair speed. It was transferred to the ship by means of the cable-paying machine, the steam required to effect this being supplied from a small steamer. Fig. 5 shows how the cable ring was placed on the ship. The cable ship was next connected and braced on its broad side with the cable-laying vessel, viz.: the Wurttembergian saloon steamer "König Wilhelm." In order to be able to steer a course as satisfactorily as possible with this somewhat awkward double ship, a buoy was set out on both sides of the lake channel at a depth of 150 metres, thus dividing the cable path into three sections of

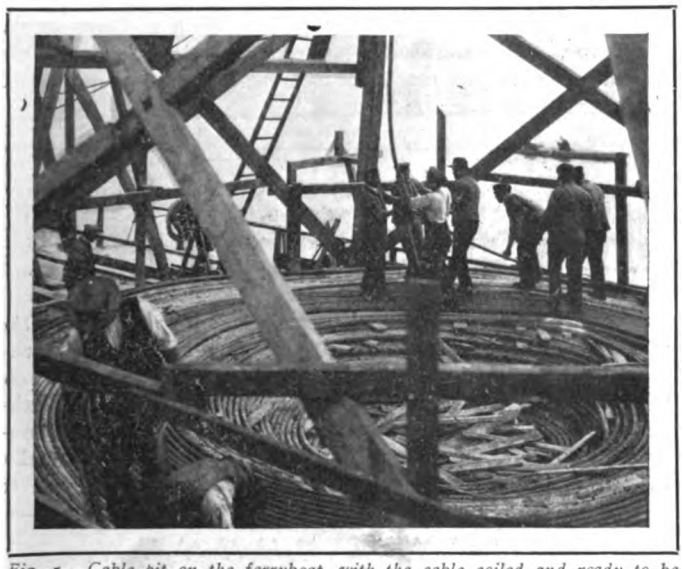

Fig. 5. Cable pit on the ferryboat, with the cable coiled and ready to be paid out.

about 4 kilometres each. The proper position of the ship was checked by means of sextants and sounding devices. The sounding device combined the functions of a wire-paying machine, measuring machine and dynamometer. A lead weight was dropped by means of a thin steel wire while measuring the wound-off length of wire. The latter was made to pass over a small dynamometer pulley, which, as the weight came into contact with the lake bottom, would drop, any traction being then eliminated.

Before proceeding with the definite laying of the cable, a trial laying was made on a short cable section comprising several coil portions at places of different depths, and containing a mushroom anchor with chain at its end. This trial was performed partly at very high speeds, the cable being in a rapid succession picked up and laid out over again, thus putting it to an extraordinary strain. In connection with all these trials the interior of the coil sections was found to be fully preserved.

After these satisfactory results the definite work was started on the morning of August 8th last. After, however, laying out about 2 kilometre lengths, a defect was noted in the cable, which had to be lifted again. The defect was found to be located in the shore cable in the neighborhood of the first coil section, and after eliminating this defect, the work was recommenced on the next morning. The steamer "König Wilhelm," with the cable ship, having sailed as close as possible to the shore, the cable end was lifted and conveyed to a provisional measuring room installed in a private building. The cable was fixed to the shore, lest it be torn off on the departure of the ship, and was placed in a dredging channel located in the neighborhood of the shore. Auxiliary pontoons and boats had to be used in this connection

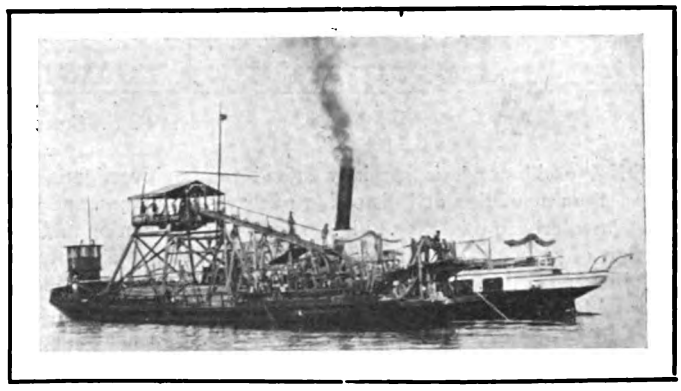

Fig. 6. Under way and paying out the cable.

(Fig. 1), it being impossible to approach the shore too immediately on the steamer.

The work proper could now be proceeded with, and after accurately ascertaining the direction of sailing the paying out of the cable occurred without any hitch or interruption (Fig. 8). The passing of the buoys was read from the paid-out length of cable, the observed figures agreeing very well with the calculated length. The paid-out length of cable was, moreover, checked by means of the small sounding machine.

As the average speed of laying out the cable was fairly accurately 6 kilometres, the work proper could be completed in about two hours, the lake cable being about 12 kilometres in length. As any defects would in all probability be detected at the very beginning, the cable, having been taken to shore, was submitted to permanent observation during 24 hours, while the cable ship, sailing back to Friedrichshafen, took up the buoys on her way.

On the following day the splice between the lake and shore cables was effected. The shore cable had been laid out a few days beforehand, its free end being supported by a buoy. After picking up the lake cable from the shore, and lifting the end of the short cable, the splice was effected by fitting a coil section on board the cable ship. The splice having next been immersed into the lake, the shore cable at Romanshorn was connected to the land cable, thus completing the whole cable laying operation.

From the above is seen that in laying out this first Pupin cable through a lake a mainly mechanical task had to be solved, the special conditions of the case being extremely difficult. In

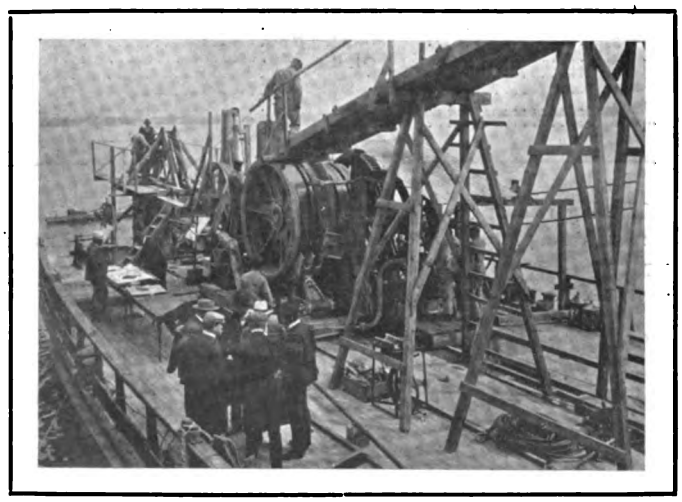

Fig 7. Arrangement of machinery for controlling the cable as it was paid out.

fact, owing to a mistake in fitting a ground connection occurred about a month afterwards in one of the strands of the cable at a point submitted to the maximum water pressure, though

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this strand did not contain any Pupin coil at the point in question. All remaining strands having preserved their satisfactory insulation, this defect was readily remedied, making the installation perfect.

The writer is indebted to Messrs. Siemens and Halske and members of their staff of engineers for numerous courtesies which have been extended to him while preparing this article.

Telephone Transmission Measurements*

By B. S. Cohen and G. M. Shepherd.

THE oscillograph is specially suited to the investigation of the attenuation and distortion of waves over lines, and particularly to the latter. Fig. 5 shows the attenuation and distortion of a fairly complex sound wave (singing "la") over a 16-mile cable line. The cable in this case was equivalent to one with 17.6 miles of 20lb. conductors, and the transmission over this length of line is very good indeed. On analyzing the received wave it is found that everything above the seventh harmonic seems to have practically been wiped out, and this harmonic represents a frequency of 980 cycles. Fig. 6 shows a

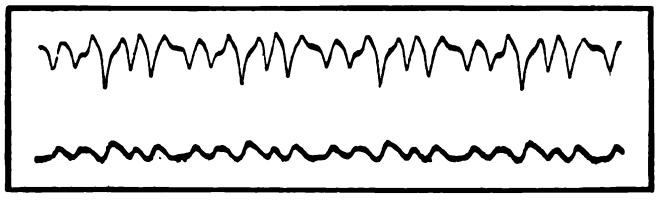


Fig. 5. Oscillograms showing attenuation and distortion over a 16-mile cable line.

note sung by a girl in a high tone, which was taken as representing the upper limit for speech frequency. The line in this case was 16.6 miles of 20lb. On analyzing these curves the highest frequency left prominent in the received wave was 3,000 cycles. This is a very high figure, and does not necessarily represent a frequency that matters, firstly, because the fundamental was exceptionally high, and, secondly, because the speech limit is not reached until about 50 miles of 20lb. cable is in circuit. Unfortunately, we have not found it possible to obtain an analyzable record over this mileage with the oscillograph. The analysis of the two waves in Fig 5 brings to light the fact that the attenuation of the current behaves in a curiously fluctuating manner as the frequency increases. Table 1 gives percentages of received currents for the various harmonics:

Harmonic.	Percentage received.	Harmonic.	Percentage received.
1 (Fundamental)	81.0	9	25.0
2	47.0	10	25.0
3	57.0	11	81.0
4	46.0	12	13.0
5	41.5	13	2.5
6	28.0	14	15.5
7	25.0	15	4.0
8	30.0		

Table 1.

The big rise at the eleventh harmonic is very noticeable. A further example of this effect is apparent in the wave-forms of Fig. 7, which represents a singing "oo" sound on 30 miles of cable. Analysis up to the eleventh harmonic shows the percentages received as given in Table 2.

Harmonic.	Percentage received.	Harmonic.	Percentage received.
1	34.3	7	6.3
2	16.7	8	1.5
3	6.0	9	33.0
4	5.0	10	16.4
5	1.0	11	8.2
6	7.3		

Table 2.

The ninth harmonic is the notable one in Table 2, and would have a frequency of about 2,295 cycles. Such analyses as the above are, of course, somewhat rough affairs, owing to the difficulty in obtaining clearly defined enlargements of attenuated

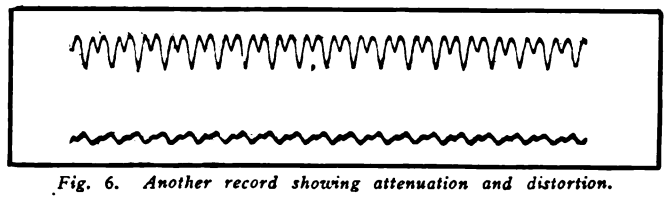


Fig. 6. Another record showing attenuation and distortion.

wave negatives; it is also an extremely laborious business. The absence, unfortunately, of any precise data regarding the terminal conditions of the circuit when these oscillograms were taken, renders it impossible to explain the phenomena theoretically. That such an occurrence is in some degree possible, however, may be demonstrated by taking an arbitrary complex E.M.F., and supposing this to be impressed upon a circuit of

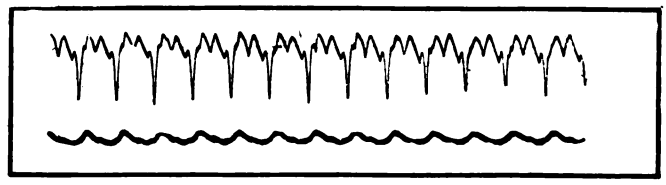


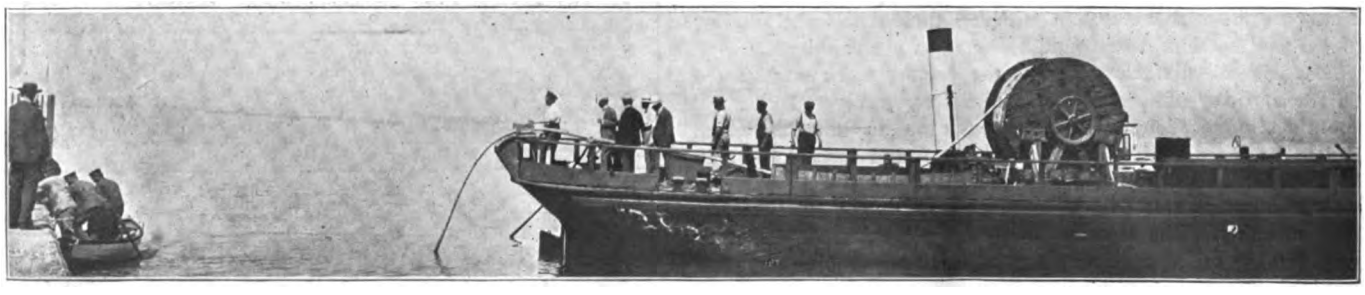
Fig. 7. Effect of 30-mile cable line on "oo" sound.

known electrical constants. Thus, let the following:

$$E = 100 \sin pt + 75 \sin (2pt - 45) + 50 \sin (5pt + 30),$$

with a fundamental of 200 cycles, be the actual potential difference at the sending end of a cable line whose data are: length, 15 miles; capacity, 0.054 microfarad per mile; resistance, 85 ohms per mile; inductance, 0; and which is terminated by a piece of apparatus, such as a telephone instrument of, say, 0.18 henry and 200 ohms. Fig. 8 shows the above function plotted out through a complete period, both for the beginning and end of the circuit. In this theoretical example the percentages of

*Abstract from a paper read before the Institution of Electric Engneers, London, continued.



Trial of Old Cable Ship for Paying Out Submarine, Lake Constance.

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received current for the three harmonics present are respectively: first, 57.4 per cent.; second, 71.5 per cent.; fifth, 14.4 per cent.

Oliver Heaviside deals with this matter at some length in his

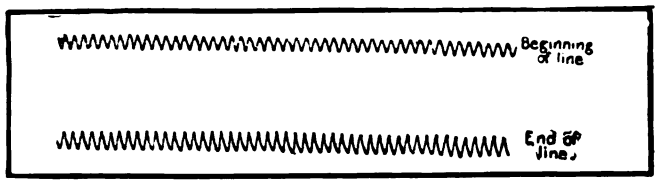

Fig. 10. Record showing wave of greater amplitude at receiving end than at transmitting end of 2.2-mile cable line.

collected papers, vol. ii, and shows by means of the equation for the receiving end impedance that the latter passes through successive maxima and minima values with increasing frequency. These fluctuations become less and less marked, and finally disappear at high frequencies. What precisely the practical effect on transmission is of this special reinforcement and diminution of certain tones we cannot at present say. The causes tending towards distortion are so many and varied that, perhaps, the resultant effect is not so strongly felt as might otherwise be the case. At all events, Heaviside's remarks regarding the instinctive quality of the human ear for recognizing what must in reality be the merest phantoms of speech vibrations, appear

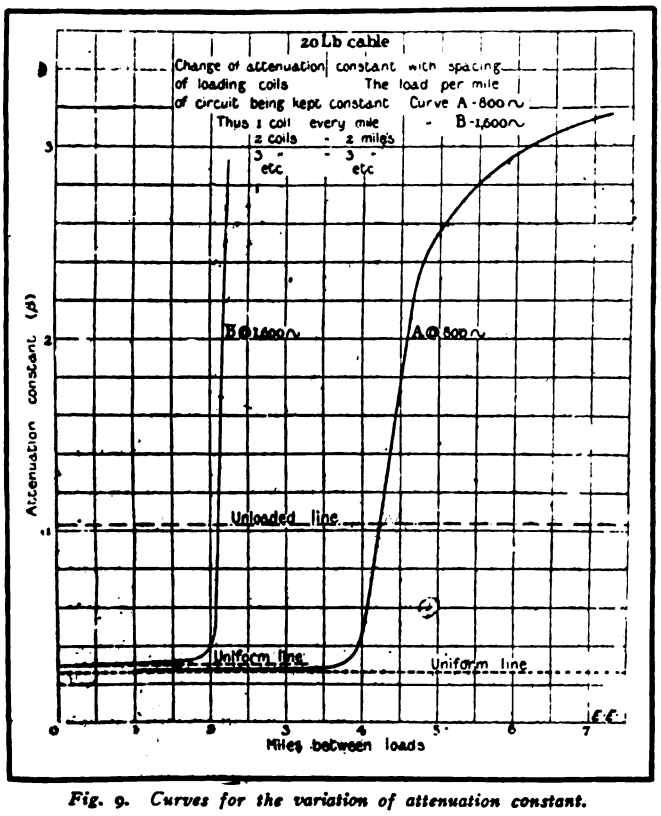
20 Lb cable
Change of attenuation constant with spacing
of loading coils The load per mile
of circuit being kept constant Curve A - 800 ~
Thus 1 coil every mile - B - 1,600 ~
2 coils - 2 miles
3 - - 3 -
etc etc
B @ 1600 ~
A @ 800 ~
Unloaded line
Uniform line
Uniform line
Attenuation constant (β)
Miles between loads

Fig. 9. Curves for the variation of attenuation constant.

to be pretty well borne out in practice. Volume is the prime necessity; articulation is, comparatively speaking, of secondary importance.

The subject of line resonance (if that term may be applied) seems, however, to be one worthy of closer investigation. As previously mentioned, figures for the highest frequency met with in speech waves, which must be retained in order to obtain intelligible speech, are of great importance, and although the oscillograph may help to obtain some idea on this subject, this method is necessarily exceedingly complex and laborious, and involves the likelihood of considerable error. It must be borne in mind that any absolute figures are out of the question, as the point at which articulation becomes so bad as to render the speech unintelligible involves the personal equation to a considerable extent.

Highest Important Frequency in Telephone Waves.

Some tests carried out on loaded lines led to an interesting method of ascertaining the highest important frequency in articulate speech. If the spacing—*i. e.*, distance apart—of loading coils is increased, and at the same time the amount of inductance per mile inserted is unchanged, the attenuation constant also increases gradually, and at one particular spacing

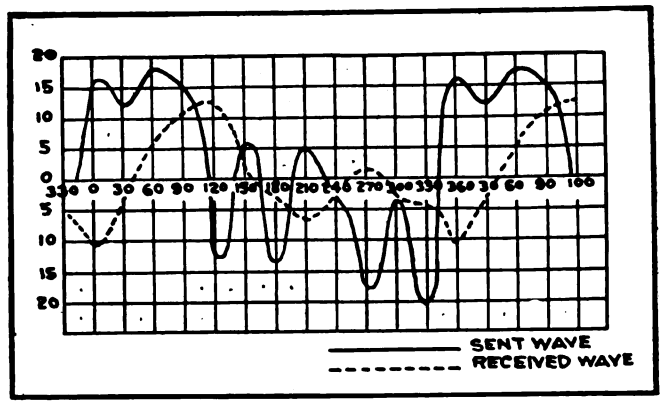

Fig. 8. Plot worked out from mathematical data.

increases to an enormous extent. Fig. 9 shows curves for the variation of attenuation constant with spacing for frequencies of 800 and 1,600 cycles. These curves were calculated from formulæ by G. A. Campbell, and have been confirmed by tests made with a sine-wave alternator. As the articulation of a received telephone wave depends to a very great extent on the attenuation of the harmonics present, it was thought that the application of the arrangement just referred to would help to settle the question as to which frequencies determine by their presence or absence the difference between articulate and inarticulate transmission. A series of articulation observations were consequently made on 20 miles of cable for increasing spacing intervals with a constant load of 0.17 henry per circuit mile and commencing with a distribution of one load per mile. It was found that a two-mile load was very slightly inferior to the unloaded line of equivalent speaking volume, but still gave excellent commercial transmission. This indicates that harmonics above 1,600 cycles may be dispensed with (see Fig. 9). With three-mile distribution the articulation was commercial, but decidedly inferior to the unloaded line. The critical frequency

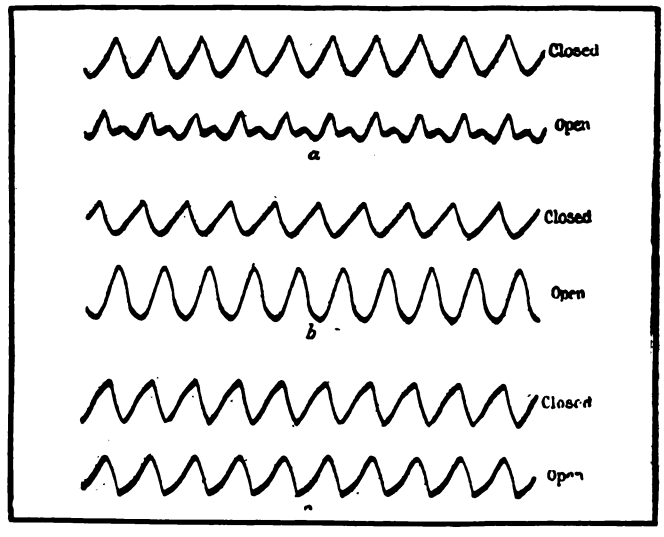

Fig. 11. Records showing variations of transmitted wave produced by opening and closing receiving end of line.

for this disposition of the load was about 1,100 cycles, and it is thus apparent that harmonics between 1,100 cycles and 1,600 cycles are valuable. For four-mile intervals speech became quite impossible, although the volume was still quite considerable, and we must, therefore, conclude that the highest indispensable frequency lies between 800 and 1,100 cycles, and also that it is desirable to retain something higher than 1,100 cycles for really high-grade transmission. Probably 1,500 cycles would be quite

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a satisfactory figure to base calculations on. Pupin and other writers use 750 to 800 cycles for many transmission calculations. It is important to note that this represents a fair average frequency, as damping constants calculated with this value can be obtained experimentally when using actual speech waves.

Relationship between Sent and Received Waves on Short Cable Lines.

On short cable lines, and provided that some amount of terminal impedance exists at both ends of the line, the relationship between the sent and received currents is somewhat peculiar. Fig. 10 shows the wave at the beginning and end of a line equivalent to 2.2 miles of 20lb. cable, and in this case the receiving end wave is of considerably greater amplitude than the wave at the transmitting end. The wave in this case was produced by whistling into the transmitter. The effect is considered further on in connection with telephone current measurements.

Fig. 11*a* shows the effect on the transmitted wave when opening and closing the receiving end of a line consisting of two miles of 20lb. cable. With this short line the cable current passing from the A to the B wires, by virtue of their mutual capacity, is smaller than the total current flowing when the far end is closed. The variation in wave-form is also very noticeable. When, however, the line is 7.5 miles of the same cable the current is actually greater when the far end is open than when it is closed (see Fig. 11*b*). Lastly, when the line gets beyond a certain length the effect on the amplitude at the transmitting end by opening and closing the receiving end is negligible. Fig. 11*c* shows the effect with 20 miles of 20-lb. cable. These phenomena, which are dealt with further in another part of this paper, are due to the action of the terminal impedance, and may prove of considerable importance to the telephone engineer, as they can be varied to a great extent by varying the impedances of the terminal apparatus. With long lines the tendency is for the impedance at the sending end to become a constant quantity, not varying appreciably with the length, and the reaction of the terminal apparatus becomes evident only to a very small degree at the sending end.

(*To be Continued.*)

The Indiana Situation*

By Chas. S. Norton.

THE Independent telephone business in Indiana was never stronger nor more firmly intrenched than it is to-day. While we have been working out the problem of universal telephone service at reasonable rates, we unwittingly developed another problem which we did not even dream, a few years ago, would ever be presented to us for solution. But it has been presented, and so far the solution seems to meet the approval of everyone except those who demanded a solution, but hoped for a different answer than the one so far given.

This new problem is no other than an unofficial proposition from the Bell interest to stop the telephonic warfare in Indiana, by agreeing to abandon its exchanges in certain places and to a merger with the Independents in other places, so that there would be only one exchange, with dual toll line connection in each community.

At the beginning there was no thought on the part of the Independents of putting the Bell out of business; in fact, they cared not whether the Bell had much or little business. The two things which they sought to establish were local ownership and control of the telephone business, and telephone service for all who wanted it at reasonable rates.

The American Telephone and Telegraph Company, with its Central Union and Cumberland subsidiary companies, espoused the cause of monopoly. The Indiana Independent Telephone Association, with its 145 member companies, championed the principle of Independent ownership and control of the telephone business. There is and can be no reconciliation between the two systems. No alliance can be formed in the telephone business which will preserve the two systems and keep alive the principles upon which each is founded, any more than monopoly and independence can be merged into one system in the oil trade, the railroad business, or any other commercial enterprise that is national in scope.

It does not take a seer to arrive at the truth of this fact, nor a prophet to tell which system will finally win. No monopoly has ever been more than temporarily successful. In fact, so far as Indiana is concerned, it is no longer a matter of speculation or doubt, for when recently the white flag of truce was unfurled by some of the Bell lieutenants their superior officers did not cite them to a courtmartial for any act of disloyalty to the Bell interest.

Recent Results.

Twelve years of conflict in Indiana has resulted in the formation of about 400 separate Independent telephone companies, the installation of 200,000 Independent telephones, and the extension of the Independent lines into every county in the State. At the same time, the monopoly, having only about one-fourth as many subscribers, acknowledges that it has lost all of its remunerative exchange business in every city in the State, with the single exception of Evansville. While it has sunk millions in its futile campaign of extermination, it freely confesses that it is in worse financial condition, in Indiana, than ever before, and makes the bold admission, in its tax report, THAT IT HAS NOT PAID A DIVIDEND SINCE 1896 AND NONE IN SIGHT.

The Bell Proposition.

This is probably the reason why six of the field agents and division superintendents of the Central Union Telephone Company appeared at a joint meeting of the First, Second and Third Districts of the Indiana Association, at Logansport, on the 28th of March, and made a written proposition to abandon, sell, lease or merge its exchange property wherever there was competition in those districts, and thereafter to connect the Bell toll lines with the remaining Independent exchanges. They also said that they would extend the proposition to cover the entire Central Union territory in Indiana; that the proposition was made with the consent of their superior officials and would be indorsed by the American Telephone and Telegraph Company, which owns 76.76 per cent. of the Central Union stock.

These three districts referred the proposition to the State Association—first passing a resolution that no proposition be considered that did not apply equally to the entire State.

Afterwards an unsigned tentative proposition which did embrace the entire Central Union territory in the State was presented to the executive committee of the State Association. The executive committee said: "If you mean business, and are willing to abandon the exchange business in this State, have your officials sign this proposition, and we will submit it to the association, which meets in regular annual convention at Indianapolis on May 15 and 16."

The executive committee believed that the Independents had nothing to fear from the Bell, for it goes on the theory that he who cannot hold by diplomacy that which he has won at arms ought never to have been a party to the conflict. The Bell officials, however, did not sign the proposition, and the State Association gave no official consideration to the unofficial proposition of the Bell field agents. What

*Abstract from an address at the International Convention, June 6, 1907.

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their actions mean we leave you to judge for yourselves, but the Indiana Association believes that if the Independents in Indiana were willing to ignore the effect upon the Independent cause in neighboring States, terms advantageous to the Independents in Indiana could be speedily made with the Central Union Telephone Company. But the Indiana Independent Telephone Association is loyal to the principles of Independent ownership and control of the telephone business not only in Indiana, but throughout the United States. We realize that while the corporate existence of our many companies may stop at State lines, the principle upon which we are founded extends throughout the nation. Our fealty to you of other States is not because you are in the telephone business, but because you, like ourselves, are fighting for the rights of the people and against the greed of a monopoly.

Our association, fearing the monopoly might think we were willing to temporize with it in Indiana, while it was trying to crush our brethren in Ohio, Wisconsin and other States, and to present as solid a front in diplomacy as it has in warfare, amended its constitution so as to make ineligible to membership any company having a Bell connection, and to cause any present member making a future connection with the Bell to forfeit its membership.

We stand to-day a solid phalanx of 145 separate companies, controlling nine-tenths of the Independent telephone business of Indiana, and opposing, not the Central Union Telephone Company or the American Telephone and Telegraph Company, as individual companies, but the principle of monopoly, and these companies in so far as they are the exponents of that principle.

We realize that if the Bell subsidiary companies could be freed from the parent company's control, these companies would then be founded upon the same basis as our own Independent companies, and we would deal with them as allies or competitors, as their interest might harmonize or conflict with our own—just as we deal with other Independent companies. But, as long as monopoly is the controlling principle of the companies forming the Bell system, they cannot be allies; they are not competitors, but are a piratical enemy to every Independent company.

There will always be more or less competition in the telephone business, dependent entirely upon conditions which may or may not necessitate competition. The same conditions that govern competition and absence of competition in other lines of business will ultimately control in the telephone field. The telephone is no more a natural monopoly than railroading or the printing of newspapers is a natural monopoly. A town that can support only one newspaper need not hope for competition in the price of newspapers or in advertising rates. If a city is large enough to support two daily papers, the merchant in that city who desires to reach all the people with his advertisement must patronize the advertising columns of both papers and pay for both. No one newspaper or railroad can adequately serve the public in our larger cities. It is a mechanical and human impossibility. It may serve them properly in the smaller cities and towns—conditions are different.

So with the telephone business. While one company may answer all of the requirements of the towns and smaller cities, no one company can ever properly serve cities like Chicago, New York, Boston, St. Louis and Indianapolis. If it is attempted, and municipal authorities refuse to allow competition, rest assured that the public will pay an exorbitant rate for inferior service, whether it be Bell or Independent. Competition is everywhere needed as a spur to each company to put forth its most diligent efforts to serve the public adequately and with economy.

Indiana's Position.

As the limelight of publicity has recently been turned on the telephone situation in Indiana, because the Independent association deigned to match its diplomacy with that of an enemy whom it had defeated in conflict, it is well that other States know Indiana's position in this matter.

We believe in competition in the telephone business, where conditions are such that competition is necessary to secure adequate service at reasonable rates. We do not believe in the monopolization of *all* the telephone business by one corporation under any condition. We believe that, when only one telephone company is necessary, it should be locally and independently owned and controlled. We are not averse to arranging with the Central Union Telephone Company and the American Telephone and Telegraph Company for joint service, whenever these corporations are ready to abandon their principles of monopoly and deal with the Independents on equal terms wherever they may be found throughout the United States.

Until the "Telephone Trust" will agree to deal as fairly with you of other States as it has agreed to do with Indiana, the Indiana Independent Telephone Association will reject any and all propositions for an alliance in the Hoosier State, for Indiana is no traitor to this the greatest commercial propaganda of the twentieth century—the Independent Telephone Movement.

Opportunities for Independent Exchange Building in Texas

By Chas. F. Speed.

"NO State in the union offers greater inducements to the telephone operator than Texas," is very far from being a mere idle boast. The accompanying map shows hundreds of miles of toll line development, yet it will be seen that only a very small portion of the State has been covered. In fact, if all the toll lines from Ohio, Indiana, Illinois, Kentucky and Michigan were moved into Texas there would be plenty of undeveloped territory. To fully appreciate the extent of territory in Texas one must consider distances, and compare them with distances near home. It is about 950 miles from Chicago to New York, and it is 867 miles from Texarkana, Tex., to El Paso, Tex.; from Delhart, which is up in the Pan Handle, to Beaumont, it is 735 miles; from Delhart to Laredo, 879 miles; from Beaumont to El Paso via the Southern Pacific system is 916 miles.

The reader must keep in mind that in this vast territory only a very small portion is not valuable for farming purposes. East Texas is the fruit, vegetable and lumber district, the soil being sandy, but very productive for the fruit grower and truck farmer. Central Texas is the cotton belt, otherwise known as the black belt, because of the exceptionally fertile soil. West Texas is known as the grass country, but produces great quantities of corn, wheat and cotton, as well as the fine cattle for which it is noted.

Texas offers almost any kind of climate, and as no part is fully developed the investor can take his pick. He can have the regulation winter and summer weather in the Pan Handle and West Texas, or he can pick strawberries all the year in South Texas. In general, the winters are mild, with freezing weather lasting only a few days; the summers are hot, but there is never

(*Continued on page 24.*)

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As the Editor Sees It

TELEPHONE STRIKES.

ON the whole, telephone companies have been singularly fortunate in avoiding that sort of trouble with employees which leads to strikes. Probably this is due in a large measure to the fact that the work itself is sufficiently varied in its nature, and calls for so much genuine initiative, care, thought, and the exercise in a rather high degree of a sense of responsibility, that those who are engaged in it actually like it. They would, in general, a great deal rather work than loaf. There is no question, too, that the telephone industry everywhere compares very favorably with others in the consideration accorded to those who work in various positions by the employing organizations. These are two of the most general things which appear to prevent strikes; and, in spite of the occurrence of local outbreaks from time to time, they may probably be relied upon to preserve in the future that mutual good will and tolerance which is necessary for the success of all concerned.

WORSE THAN CAPACITY.

THERE are two kinds of investigation being carried on with the object of improving telephonic transmission. One branch has for its object the extension of the limiting distance for transmission over open wires and through cables. Successful work in this line can be done only by brilliant men, with the soundest education in physical and mathematical theory, and wide experience in telephone practice. Whatever results they are producing come very slowly, after long and careful study and experiment. Their work is beset with disappointments, because every step in advance which they take is new. A change may mean genuine progress, or it may not. The soundness of a new theory can only be proved by a practical demonstration, which takes time.

The other kind of work for the improvement of transmission covers a different field. It is as wide open to the man who has just learned to solder or splice a joint as to the most highly trained engineer. One can engage in it with no more equipment than good sense and a good pair of eyes. The lineman employed a month ago ought to know what to do with these tools; simply look for low insulation and high resistance. These two things reduce the efficiency of transmission on millions of telephone messages, where the capacity of a telephone line prevents the sending of a dozen. So they are worth looking for, and worth clearing.

Their causes are easy to find. If all of the employees in an exchange would hold an experience meeting and appoint a secretary to take notes, they could probably compile in an hour or two a very nearly complete list of the things which aggravate these undesirable conditions. Poor joints in wires, loose connections in cable boxes and distributing frames, broken insulators, cracked insulation on covered wire, contact with trees and buildings; such simple things as these would be comprised in the list. Is it not possible for anyone with good eyes and an alert and curious disposition to find them? Then for their repair. A proper kit of tools and material—not too large a one, but rather one well selected—and the motto "Do it Now" will accomplish wonders.

Now for the practical results of this kind of transmission investigation and improvement: The question is, "What will it do?" It is probably a good thing to start in with the service. It is easy to see that improvement in transmission does a good deal more than to make it possible for John Smith at Albion to hear Charles Jones at Osceola, and understand everything he says as if the two men were in the same room. In the first place, when Smith takes his receiver off the hook he gets from his operator a clear, pleasant toned demand for the number wanted. She can modulate her voice to the very best of her natural ability, because she knows that all of the lines are alike, all good, and she does not have to shout to make herself heard. She hears his number, repeats it back quickly and correctly, so that at the very start he knows he is sure of a good connection. He gets it and talks as easily as if the conversation were direct. His business is not only accomplished, but is finished without bringing upon him the slightest annoyance, so the man who follows the line of least resistance, as well as the one who appreciates the method of highest efficiency, in communication, will use the telephone. That is why good lines increase the business of a company.

Even the construction department comes in for benefits from this work. Of course things are put up in good shape in the first place; they always are, if the story is told more than a year after the plant is built. But if all the lines are constantly kept in good shape the construction department will find that it can concentrate its efforts almost entirely on new work. It has time to put its energy into productive building, instead of wasting time ripping out and replacing material which should have been as sound as when first installed.

The best feature of this transmission improvement work is the speed with which results can be obtained. If all the employees would pull together to attain such an object it would probably take only a few months to make the subscribers wonder what had boosted the service.

Then, too, a contented subscriber is the best contract agent in the world and if a man has sense enough to appreciate good service, and good clear transmission of his words to one of his associates and the other man's talk to him, he is going to spread the word among his neighbors. This is how good transmission builds business. The things that make it, along the lines we have mentioned, decrease maintenance expense too, thus increasing the profits. If the management is square that means better salaries for inspectors and linemen. Thus they are bound to get direct rewards for such efforts, which if systematically carried out, would exercise an almost incalculable influence upon the improvement of transmission.

THE NECESSITY OF SYSTEMATIC CO-OPERATION.

WHERE work involving preparation for growth in business is divided among many departments of an organization, any lagging of units behind the general line of advance is liable to produce a very unfavorable impression on customers. A newspaper in a Pacific Coast city printed, a few days ago, a rather remarkable letter, calling attention to a series of faults of this kind. The writer stated that a telephone had been ordered by him about the first of February, and installation of the instrument promised within two weeks. After the end of this period had been reached, and some further time had elapsed, inquiries were made repeatedly, and complaints on the failure to receive service were met with a variety of excuses and explanations. First there was no cable in the street, and none could be installed until received from the East; after the cable was put up, switchboard material was needed before the installation could be completed, and so the delay went on.

As far as the telephone company was concerned, this shows a painful lack of co-ordination of effort, and a lamentable lack of ability to deal with real conditions by employees all along the line. To begin with, the experience emphasizes the value of the precept laid down for his subordinates by a man who has built up from the smallest beginnings a large manufacturing business. His most urgent instructions are to promise no deliveries unless absolutely certain that they can be made on time. One who is so disposed can start here and pick out a series of texts for strong sermons to the superintendent, or whoever is in charge of the organization in that district, that will cover a good broad field. The whole point is, however, that it is just as bad business for a telephone company as for any manufacturer to make promises when it knows that it cannot deliver the goods. When a company habitually falls down in this manner it is no wonder that if it issues from time to time tirades against the evils of competition they fail to convince the public.

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The Way of the Law

CONDUCTED BY A. H. MCMILLAN.

TREE TRIMMING AND OTHER FEATURES OF FRANCHISE.

Some time ago we got a new franchise, granted by the council of the city of ———, Kansas. Our old franchise we thought was defective, and we think our new one is also, but it is all the council would do. It promised to pass a general ordinance putting telephone companies on the same basis.

I enclose a copy of our franchise for your inspection. One clause that we object to is in parenthesis.

As I stated before, the first telephone company was granted the right to place poles and wires on all the streets, and has done so, and is doing so to-day and cutting timber right and left.

The R——Telephone Company was granted the second franchise. It was not permitted to use one of the streets except to cross them, but granted the use of the alleys. The third franchise was granted the E—— Telephone Company. It was granted the use of all the streets and alleys except Main street, and permitted to cross all the streets whenever necessary. Then we found out (or thought so at least) that our franchise was defective, we got one written up word for word except as to names and you can see by enclosed copy what it is.

The part enclosed in parenthesis is an additional burden that the other companies have not got. We have a few poles on one street; we could not get into the town without running on some street. The different additions do not correspond as to streets and alleys. You start out on one alley and run through until you run up against another addition and you are likely to strike the center of a block on the opposite side of the street. The above may be monotonous, but I have tried to give the facts in the case so you can understand them. What we would like to know is:

(1) Have we any franchise at all under the laws of Kansas, taking the number of franchises into consideration and all the other companies' franchises into consideration?

(2) Can the City Council pass a general ordinance under the circumstances governing all telephone companies?

(3) Can the council let one company build on all the streets including Main street and keep other companies off of the streets except to cross them?

(4) If our franchise is legal how far can we go in trimming shade trees?

(5) Can the council compel the telephone company to move its poles and wires off of the streets after it has been granted (in 1901) a franchise giving it the use of all the streets for the term of 21 years?

(6) If they cannot be made to move can other companies have like privileges under the laws of Kansas against the council's demands. Population of the town is about 1,500. The council pretends to want us to come in, but claims it wants to guard against any other mistakes. We have a switchboard and about forty telephones in the town now. The city has a good many cement walks, some 12 feet wide and less, streets 101 to 110 feet wide. There is a row of trees against the outer edge of the walks and in a good many cases there is a second row of trees three and four feet further out in the street, so, you can see, we can hardly cross a street under our franchise. We started to dig a few holes on a street, and we had to stop as the council informed us that it would run an injunction on us if we did not stop. We were doing that to avoid the shade trees.

Please tell us what our rights are and give us a decision, if any, in the case. S. S. M., Kas.

The editor will answer the above questions as well as he can in the order in which they are asked.

1. The franchise which you submit with your questions seems to be valid under the laws of Kansas, although of course we cannot know what the steps taken by the council in passing it were, and whether such steps comply with the law or not. There is no obligation upon a council to grant the same privileges to all companies in the same line of business.

2. The city council could pass an ordinance under the circumstances governing all telephone companies in the city, and that would be a just and satisfactory method of regulating such companies.

3. The council may lawfully grant to one company greater privileges than it does to others because it is legislating in the interest of the public and not in the interest or for the benefit of the companies. It can, therefore, let one company build on all the streets, including Main street, and keep other companies off of the streets excepting to cross them.

4. In trimming shade trees, you may do such cutting as is reasonably necessary to permit your lines to be erected, but should be very careful never to exceed the limit of actual necessity. In trimming any trees that stand upon private property, you should get the consent of the owner of the trees before doing so. The clause in the ordinance which governs this question, reads as follows: "Provided they shall....in no instance ....destroy or injure any growing trees now in said streets, alleys or highways, or any trees which may hereafter be planted in the parkage abutting on such streets and alleys." Reasonable trimming of a tree constitutes neither a destruction nor injury of it.

5. After granting a franchise giving it the use of all the streets, the council could not legally compel a telephone company to move its poles and wires off the streets during the term of the franchise. If the franchise was repealed, and the telephone company consented to its repeal, a different situation would be presented, and a different answer required to the question.

6. It might be that one company could be compelled to move and other companies not be compelled to move, owing to differences in franchises. As we have shown above it is not necessary in the granting of franchises that all companies should be treated alike.

RIGHTS OF URBAN ABUTTERS IN NEW YORK.

Will you kindly shed a little light on the following subjects, assuming that a telephone company is operating in an incorporated city under a regular franchise from the state, and that in addition it has been granted permission by the Common Council of said city to set poles and string its wires in and upon the streets of the city, and the telephone company, in pursuance of its business, desires to set a pole between the sidewalk and curbing in one of the main streets:

1. (a) Does the consent of the abutting property owner have to be obtained? (b) Does any further consent from the city need to be obtained?

2. If, without consent, a pole were placed and the wires strung thereon, would the property owner be entitled to any legal redress, and if so, what?

3. Could the telephone company be compelled, under any circumstances, to remove the pole after the wires had been strung and placed in actual service?

4. Would the fact that no objection was made at the time the pole was placed have any effect in a case of this kind?

The company above referred to is operating in this city under a franchise granted by the State of New York in 1895.

We will thank you for prompt answers to the foregoing questions and other information which would bear on this case. TELEPHONE.

THE answers to the question whether the consent of the abutting property owner is to be obtained before a pole can be set between the sidewalk and curbing in front of his property depends upon the question whether the setting of such pole constitutes an additional burden upon the fee or interest of the abutting owner in the street. It is held in the State of New York that where the fee is in the abutting property owner or even in the city itself, the erection of telephone poles constitutes an additional burden upon the adjacent property. Metropolitan Telegraph and Telephone Co. vs. Cowell Lead Co., 662 How. (N. Y.), 3657, 50 N. Y. S. Super., 468, 1 Am. Elec. Cas., 464; Andrews vs. Delhi, etc., Tel. Co., 36 Misc. (N. Y.), 23; Gray vs. N. Y. State Tel. Co., 36 Misc. (N. Y.) 108. The consent of the abutting property owners should therefore be obtained before the pole is set. (b) No further consent from the city is necessary.

2. If, without consent, a pole is placed and wires strung thereon, the abutting property owner should be entitled to bring an action of ejectment against the telephone company to compel the removal of the pole. Little vs. American Tel. & Tel. Co., 8 N. Y. S., 136.

3. The telephone company could be compelled to remove the pole even after the wires have been strung and placed in actual service. Neither the placing of the pole nor the use of the wires strung upon it can be held to alter the rights of the abutting owner.

4. The fact that no objection was made at the time the pole was placed would have no effect in a case of this kind. In fact, where a company entered upon a highway without permission and afterward obtained permission of the abutting land owner, it was held that an implied license had been created which was revocable at the will of the land owner. Little vs. American Tel. & Tel. Co., supra.

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OPPORTUNITIES FOR INDEPENDENT EXCHANGE BUILDING IN TEXAS.

(*Continued from page 21.*)

excessive temperature; the constant breeze off the gulf is refreshing day and night.

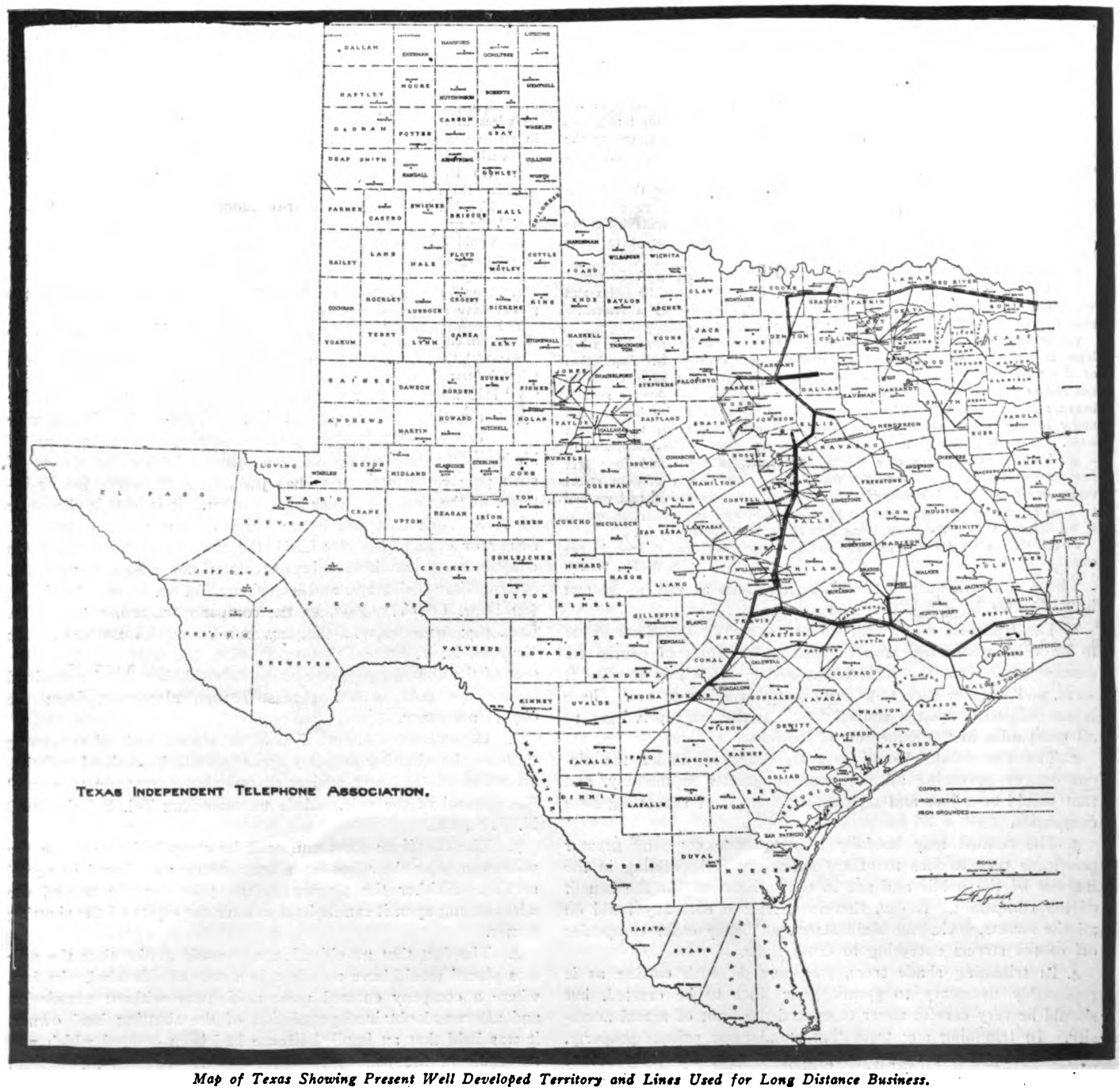
Toll lines in the Southwest are built on the right-of-way of the railroads. State laws make it possible to condemn this right of way for a compensation usually fixed at five dollars per mile. This right-of-way gives a space free from trees, and with it the opportunity to distribute poles and materials from the local freights and special trains.

Many Texas operators say that there is no better pole for telephone construction than the southern pine. Properly creosoted it will last for thirty or forty years. Creosoting plants are located at Texarkana, Galveston and Beaumont. The best arm locally obtainable is the long leaf yellow pine, which is abundant in Texas, and when creosoted will last for many years. The best known wood pins are the bois d'arc. They are strong and have the lasting quality. This wood is found in North Texas. It will be seen that Texas has the necessary materials except glass and wire, which can be shipped in at water rate with very little extra cost. The right-of-way is an advantage in first cost as well as maintainance.

From a toll business standpoint Texas is not surpassed, if equalled, when the population is considered. The average per subscriber is six to twelve dollars, according to the location. The city of Dallas with 10,000 (Bell) telephones is said to be doing a toll business of $200,000 a year. There is a world of undeveloped exchange territory at rates of $1.50 to $2.50 in the smaller towns, or $2.00 and $3.00 in towns supporting 600 to 1,000 telephones.

With these conditions one would ask the question, "Why do not the Texas people build the exchanges and toll lines?" They are doing so as fast as they can, the one subject at all directors' meetings being, "How much money can we put up?"

The matter of selling stocks and bonds in this country is more difficult than in most places, for money brings from 8 to 20 per cent. and not many are disposed to tie up their money in bonds when land values are increasing as they are at present. There is a constant flow of settlers into the state. These people are coming from the North, where they know the Independent movement and are ready for their Independent telephones as soon as they are located.



Map of Texas Showing Present Well Developed Territory and Lines Used for Long Distance Business.

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From Here and There

TELEPHONE SAVES FARMER'S BUILDINGS.

FROM Beaver Dam, Wis., comes a report telling how a telephone company was instrumental in saving the buildings of a farmer. H. T. Marshall was awakened about 2:15 A. M. by the thunder accompanying a lightning stroke which set fire to a large straw stack which stood within ten feet of a group of valuable buildings. Mr. Marshall promptly called up the telephone exchange, and the operator notified all of his neighbors, so that within a few minutes fifteen or twenty men had gathered to fight the flames. The men worked so vigorously that practically no damage was done to the buildings. Without the telephones in the homes of Mr. Marshall and his neighbors many of his most valuable buildings would undoubtedly have been burned.

SASKATCHEWAN BUSINESS MEN CALL FOR GOVERNMENT TELEPHONE SERVICE.

AT a meeting of the associated boards of trade held at Prince Albert, Sask., there was adopted a resolution approving the action of the government of Alberta in taking steps to provide a government telephone service. The members of the boards expressed their conviction that this was a very necessary step towards providing a satisfactory, economical and adequate service for the people in this section of Canada, and in their resolution called upon the Saskatchewan government to take action similar to that of the Alberta government. This resolution was passed without a dissenting vote by the members.

WISCONSIN SUBSCRIBERS COMPLAIN AGAINST BELL RATES UNDER NEW PUBLIC UTILITIES BILL.

ACCORDING to recent reports from Wisconsin, the telephone subscribers at Marinette are looking to the railway commission for relief from what they claim are unduly high rates of the Bell telephone company. It is said that a formal complaint will soon be filed with the railway commission, requesting that it make an examination into the rates now charged, under the authority conferred by the new utilities bill. It is also stated that several of the other smaller cities in the state have requested information as to the method of filing a complaint, so that further developments along this line may probably be expected.

Charles West, Secretary of the International Independent Telephone Association.

THEODORE N. VAIL ELECTED PRESIDENT OF THE NEW YORK TELEPHONE COMPANY.

THEODORE N. VAIL, who was recently elected president of the American Telephone & Telegraph Company, was on July 5th chosen to succeed the late Charles F. Cutler as president of the New York Telephone Company.

PROGRESS OF GOVERNMENT LONG DISTANCE LINES IN ALBERTA.

REPORTS from Edmonton, Alberta, Canada, state that the provincial government now has seventy-five men at work upon long distance telephone lines. These are being built from Edmonton to Lloydminster, Wetaskiwin to Daysland, Lacombe to Stettler, Blairmore to Calgary and Calgary to Banff. Plans have been made for the installation of exchange equipment in each town as soon as the connecting long distance line has been completed, so that an office may be opened for business at once. The work is being carried on under the direction of Superintendent S. Edwards, of Edmonton, Alberta.

INCREASED TELEPHONE RATES CAUSE A MASS MEETING IN LOUISIANA.

THE citizens of Crystal Springs, La., and vicinity, recently held a mass meeting to consider a method of combating the announced increase in rates for telephone service. When the Cumberland Telephone & Telegraph Company stated that its rates for service in the county would be increased, a paper was circulated and signed by many subscribers, who thereby announced their intention of discontinuing the use of the telephone if the increased rates should go into effect. A mass meeting was held to discuss the advisability of presenting the matter to the railway commissioners, to see if some satisfactory adjustment could not be made. A committee of five members of leading citizens of the town was appointed to take the necessary action.

THE BELL TELEPHONE COMPANY GRADUALLY LOSING TERRITORY IN INDIANA.

EVIDENCES come to hand every day of the gradual passing of the Bell telephone company in Indiana, at least as relating to local business. During the past week the Cumberland telephone officials notified the city officials of Petersburg that they had decided not to pay the $500 bonus and 2 per cent. of the annual receipts for a future franchise to do business, and stated that the company would remove its property from the streets on July 10 and quit the field.

The Central Union Telephone Company has closed its local exchanges in Wabash, Peru, Bunkerhill and other points in Northern Indiana recently and has abandoned the field. The toll line stations are in charge of one man. The passing of the local systems is due to successful rivalry of the Independent companies. The Wabash exchange was established in 1894 and it had a monopoly of the business until 1897, when the Home Telephone Company was organized by the citizens who would no longer endure the treatment accorded by the Central Union. The Home Company has just completed a new and modern exchange building and practically controlled all the business in the city of Wabash. The Central Union recently sought the passage of an ordinance by the Wabash council not limiting the price to be paid for telephones. This was defeated and then the company abandoned the field, having given up hope of carrying on a successful business.

NORTHEAST TEXAS ASSOCIATION MEETS.

MEMBERS of the Northeast Texas Independent Telephone Association recently held a two days' convention in Greenville, Texas. The territory covered by this association lies east of Sherman and north of the Texas and Pacific Railroad. Although the members reported a great deal of business in their exchanges which demanded their attention, there was, nevertheless, a first-class attendance at the meeting.

In response to the roll call, each member gave a brief statement of the condition of his plant, and rate of progress. These showed that the territory was in first-class condition. Among the interesting papers read was one entitled "Mind Your Business," by C. A. Chock, of Sherman, and "The Telephone Clearing House," by T. P. Stillwell, of Lone Oak. A feature of the meeting which appealed to many members was a discussion of "Mutual Companies," in which views were expressed by G. T. Cole, of Yantis; J. S. Campbell, of Sulphur Springs, A. A. Seigler, of Blue Ridge; J. W. Segler, of Wolfe City; Mount Taylor, of Mount Vernon; W. H. Steed, of Kingston, and others.

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Your Question—Our Answer

REDUCING CROSS TALK ON GROUNDED LINES.—(884.)

Is it possible to lessen the cross talk on parallel lines without going to the expense of making them metallic? I have one exchange of about fifty subscribers, they are very much scattered, making the lines long and parallel. (They are from 300 yards to 3 miles in length.) Would it do any good if I should run out a common ground and connect all the subscribers' ground wires to it. I would make the lot metallic if it were not for submarine cables. I will be greatly obliged for your advice.

R. A. F.

You will always get cross talk to some extent on lines of this character. You can, however, reduce it to a minimum by making your ground connections as good as is possible to secure. Use long ground rods at your telephones and solder securely the ground connections. Have your central office ground as good as it possibly can be made. In order to do this it would be well to dig a hole as close to your switchboard as is possible, and as deep as is convenient, into the bottom of which place a mass of copper and surround it with charcoal. This copper may be in the shape of wire or other scrap. From this mass of copper, and attached securely to it, run a heavy copper conductor, as heavy as you may be able to procure, and we feel certain that your cross talk will be greatly lessened.

The common ground on your lines will not help you unless the condition of the soil is such that you cannot get a good natural ground.

MEASURING INTERNAL RESISTANCE OF STORAGE BATTERY.—(885.)

Please publish in your paper, or write me at an early date, some accurate and reliable way of finding out the internal resistance of a storage battery. I have one description where the battery to be measured forms one side of the Wheatstone bridge, and another where you join two batteries in opposition to one another and then measuring them with a Wheatstone bridge. That also, I find, is very unreliable. I wish to thank you in advance for the answer to this query, as I feel certain it will be correct, as have been the answers to numerous queries sent you in the past.

E. E. S.

A method for measuring the internal resistance of the storage battery as given by Professor Grassi of France, is one which is very simple and yet at the same time assures of accurate results. In Fig. 885 X represents a storage battery or accumulator having an internal resistance x. a, b, c, and d are four resistances so determined that b d equal a c, resistance d however being highly inductive. G is a galvanometer, r is a

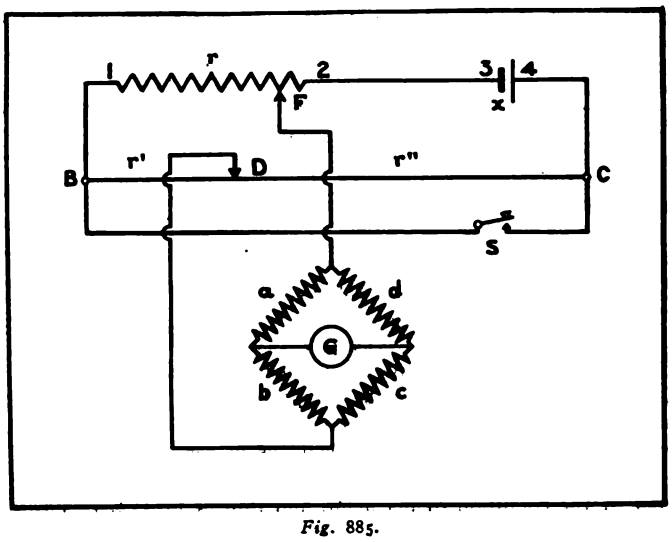

Fig. 885.

standard resistance, B C a calibrated stretched wire and D a sliding contact.

In measuring the resistance the wire F is connected successively to the terminals 1, 2, 3 and 4. For each connection the position of D is adjusted until the galvanometer G indicator remains at zero when the switch S is opened and closed. Having taken the readings of the calibrated wire B C for the positions 1, 2, 3, and 4, which we will call e, f, g, and h, we will determine the resistance as

$$x = r\frac{h-g}{f-e}.$$

This will give you the internal resistance of your storage cell.

VARLEY LOOP TEST.—(886.)

Kindly show through the columns of your excellent paper the manner of locating a ground in a cable conductor by the Varley method, or as it is more often called, the Varley Loop Test. C. M. B.

This test is accomplished with a Wheatstone bridge connected in the manner shown in Figure 886.

The battery is grounded and its circuit is completed by the

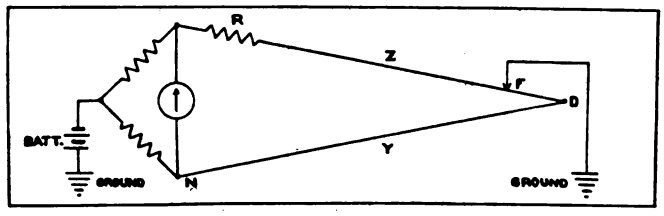

Fig. 886.

ground at the fault F. The faulty conductor is connected at the far end D with a good wire.

It will be readily seen that to obtain a balance the rheostat r must be adjusted until its resistance added to that of conductor between M and F together equal the resistance from F to N. It will also be clear that the resistance of the ground at F only reduces the energy of the battery current; therefore, this test is independent of the resistance of the fault F.

Then using the letters shown in the diagram, let Z be the resistance of the conductor F to M. Y the resistance of the conductors from F to N. R the resistance of the entire loop M D N. F the resistance of the fault and r the resistance of the rheostat when the galvanometer is balanced. Then $Y + Z = R$. and $Y + F = r + Z + F$ or $Y = r + Z$.

Z then equals $\frac{R-r}{2}$.

The distance x of the fault from M is

$$\frac{R}{Z} = \frac{L}{X} \text{ or } X = \frac{ZL}{R}.$$

FROST BAD FOR GROUND RINGING.—(887.)

We have some fifty rural 'phones situated on a rocky elevation some three miles from the exchange, they are magneto 'phones, we ring them grounded, they also ring each other on their line grounded, by using the push button they ring the exchange metallic. In winter time when it is very cold it is almost impossible for the exchange to ring any of the subscribers on this elevation, although they can ring the exchange and the subscribers on the line can ring each other. The only time we are bothered is in cold weather; at present you could not wish for better lines. What is the reason for this, and what can we do to fix them up before next winter?

D. F. I.

This is evidently an example of the playful pranks of one "Jack Frost." As your rural telephones are located on the hill some distance from your exchange it is probable that the snow will drift very badly in the winter, leaving many open places, thus allowing the ground to freeze very deep.

As your subscribers ring the central office metallic, this does not affect them so that they have no trouble in securing connection with the operator. And as the distance from your exchange to your subscribers is greater than is the distance between the subscribers, they are thus enabled to ring each other with much greater ease than you can ring them.

We would suggest that you install long ground rods and place them in cellars or other places where the frost may not have opportunity to enter.

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SECOND HAND switchboards for sale—2 100 capacity Chicago Telephone Supply Co.; 1 200 capacity and 1 100 capacity Western Telephone Construction; 1 100 capacity Swedish-American; 2 50 capacity and 2 100 capacity Eureka; 1 100 capacity Standard; 3 100 capacity Keystone; 3 200 capacity and 1 100 capacity North. Address Victor Telephone Works, 6583 State St., Chicago, Ill. 817

ALL COPPER TELEPHONE PLANT, 100 miles from Cleveland; rapidly growing county seat; 25 per cent. investment or better, if taken immediately. Good reasons. Address Box 871, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York 871

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

A SUCCESSFUL, progressive Telephone Manager having full charge of six exchanges wishes to make a change within sixty days. In replying state salary and territory. Address Box 853, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 853

WANTED—Position by married man as cable splicer and extra trouble man in town of 10,000 or 15,000. State full particulars regarding population, duties, salary, etc. Address Box 863, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 863

WANTED—Back numbers of AMERICAN TELEPHONE JOURNAL for January, February and March, 1907. Address, stating lowest price, Box 840, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 840

COMPETENT man wishes position as telephone auditor or accountant, capable of going ahead with office detail or installing system, latest ideas, best of references. Address, Box 856, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 856

WANTED—Position with telephone company as superintendent or manager by married man; 10 years' experience in telephone work. Good on instruments, switchboard and construction. Desires to make change. Good reference. Address Box 865, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 865

WANTED---Continued

WANTED—Manager of common battery exchange wants position in town of 8,000 to 10,000. Experienced in construction, maintenance and business. Can furnish good references. Address Box 866, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 866

WANTED—Position as manager or superintendent of telephone company, Kansas or Missouri preferred. Experienced in all lines of construction, repair and maintenance, switchboards, lines and instruments. Eight years' experience. Best of references. Address, Box 858, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 858

OPEN FOR ENGAGEMENT—Construction engineer, American, married, civil engineering education, now employed with a large Bell Telephone Company, wishes position as manager or engineer with smaller company. Expert estimator and capable executive; thoroughly conversant with Development, Transmission, Construction Work and Telephone Exchange Building. Can absolutely produce results. Correspondence solicited. Address Box 862, care AMERICAN TELELPHONE JOURNAL, 100 William St., New York. 862

WANTED—Position with telephone company as maintenance or instrument man. Five years' experience. Best of reference. Address Box 867, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 867

WANTED—Position as superintendent by a man of 26, thoroughly familiar with all branches of the telephone business; at present have charge of all the work on a Bell exchange of 3,500 subscribers. Address Box 857, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 857

WANTED—Position as wire chief or local manager in Middle West. Graduate of an electrical school; four years' experience as wire chief and switchboard repair man in central energy systems. Address Box 869, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 869

POSITION WANTED—Young man, 24, three years' experience in installation of P. B. X. switchboard, intercommunicating systems and interested in the trade; salary $21. Address Box 870, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 870

WANTED—Position by competent young man as manager or superintendent of telephone exchange, not over eight hundred subscribers. Six years' experience. Good habits; best reference furnished. Address, Box 859, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 859

WANTED—Experienced telephone salesman. Must be thoroughly acquainted with magneto and common battery systems. Splendid opportunity for right man. Exceptionally good territory. Address Box 860, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 860

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With the Inventors

CABLE ROLLER.

W. Callahan, Quincy, Ill., patent 856,335, June 11, 1907.

The device described in this patent comprises an angle supporting frame having mounted thereon a grooved wheel upon which the cable may rest during the pulling process, and a handle by means of which the supporting strand or messenger wire may be tightly gripped and the device held solidly in place. The roller portion of the device is mounted upon an axis the length of which is slightly over twice the width of the roller. This allows of a retaining pin being withdrawn and the roller moved out to the end of the axis so that the cable may be inserted in the groove of the roller, at which time the roller is moved back to normal position and the retaining pin again inserted.

TELEPHONE APPARATUS.

W. Kaisling, Chicago, patent (No. 856,260, June 11, 1907) assigned to S. C. Tel. Mfg. Co.

This relates to the arrangement of the various parts of a telephone on the backboard of the instrument in such a manner as to avoid all unnecessary wiring in the instrument. The hook-switch, induction coil and condenser are all mounted on the backboard proper, the wiring of which passes between the backboard and a false back so as to be effectually concealed and out of the way at all times.

The front portion of the instrument containing the ringer movement drops forward away from the backboard, leaving all of the parts exposed and readily accessible for inspection.

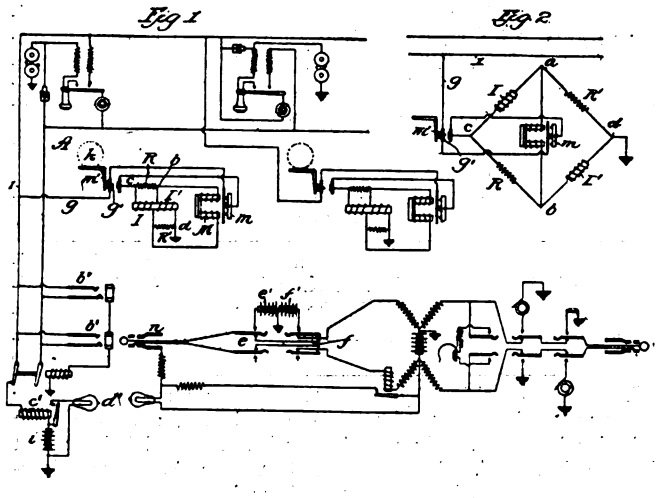
Another feature the inventor had in mind was the elimination of the double escutcheon plate around the hook switch, as is customarily used.

COIN COLLECTOR CIRCUIT.

J. G. Roberts, Chicago, patent 851,838, April 30, 1907, assigned to W. E. Co.

The circuit described in this patent provides means whereby the coin deposited in the instrument may be under the control of the central office operator.

M shows the coin controlled magnet which is operated in a circuit taken from the tip side of the line to ground through a connection in the form of Wheatstone bridge in which two inductive windings *I* and I^1 are included together with two non-inductive windings *R* and R^1, and the inventor states that in such

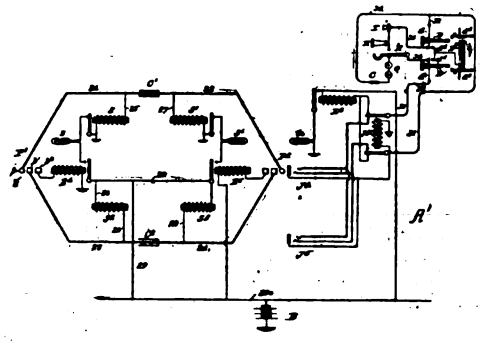


an arrangement is possible to so balance the impedance in the arms that the points *a* and *b* will be practically at the same potential when an alternating or pulsating current such as is used in ringing passes through the winding in parallel to ground, the operation of the system being dependent upon the fact that when a direct current is thrown on the line, the drop in potential would be less in *I* and I^1 than in *R* and R^1, being dependent upon the resistances so that the points *a* and *b* are no longer at the same potential and current flows through the coin controlling magnet.

TELEPHONE EXCHANGE SYSTEM.

E. E. Clement, Washington, D. C., patent 850,344, June 16, 1907.

The system described in this patent is that of the divided multiple type in which the lines have but one signal. The special feature of the invention is the method of trunking



calls. When the line signal is displayed, a trunk plug is inserted in the line jack, and whether the trunk signal shall be displayed at one division or another of the board is determined by the selective signal on the subscriber's instrument.

In the instrument A^1, *d* and d^2 are push buttons which are held in place by a latch controlled by the magnet D^2. The relay M^2 and the relay L^6 govern the line signal m, J^4 and J^5 being multiple jacks of the line. The cord circuit shown is the trunking cord circuit, P^1 and P^2 being the plugs, the entire duty of the operator having these plugs being to insert or withdraw them from the jacks according to the signal shown by the supervisory lamps *S* and S^1 which are governed by the condition of the subscriber's line.

TELEPHONE EXCHANGE SYSTEM.

H. G. Webster, Chicago, patent 855,546, June 4, 1907, assigned to Milo G. Kellogg, Chicago.

The system described in this patent consists of a two wire common battery exchange system in which spring jacks are provided at the central exchange, permanently connected with the line, and the circuits controlled by the cut off relay are so arranged that the circuit of the different sides of the line is not interrupted upon the insertion of an answering plug in the jack in response to a calling signal.

The object of the inventor is to provide an organization of circuits and apparatus for systems of the common battery class in which the objectionable click or noise in the subscriber's receiver upon the insertion of the operator's plug in the jack is entirely eliminated.

CONDUIT THREADER.

E. J. Hutchins, New Haven, Conn., patent 855,952, June 4, 1907.

The apparatus described in this patent comprises an arrangement of short jointed rods wound upon a large drum together with a wheel of size equal to that of the drum, a curved pipe extending from the device down through the manhole and entering into the mouth of the duct.

In operation the device is intended to force the knuckle jointed rods through the tube into the duct, from which they emerge at the distant end.

Here is attached a rope of steel or some other suitable material by means of which the cable may be pulled into the duct. The drum is then revolved in the opposite direction, withdrawing the rods from the duct and thus pulling in the cable.

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WHY
Dividends Can Be Guaranteed
BY CERTAIN
Independent Telephone Companies

Apparatus used creates a demand for telephone service.

It is practically indestructible, consequently service is not interrupted.

Cost of maintenance is reduced to a

MINIMUM.

Revenue is had from more than five times the usual number of extension stations.

Every subscriber works for the Company, because he advises his friends to get the service he finds indispensable.

?

WE HAVE THE ANSWER

THE WIRE & TELEPHONE CO. OF AMERICA

ROME, N. Y.

SIMPLICITY

Note how easy it is to splice pairs when you use HARGIS CABLE SPLICING JOINTS. Note how easy it is to get into the joint in case you have to test out for trouble.

If you are stringing several lengths of cable and a storm blows up, you can get your cable ends into a moisture-proof HARGIS JOINT in no time and thus prevent moisture from getting into your cables. When the weather clears up, your lineman can go out and splice the pairs in each joint.

While an expert cable splicer is rigging up his platform, etc., to start to work on a horizontal joint, a lineman can wipe in a HARGIS JOINT. The lineman can have all his pairs spliced and be off to the next job about the time the expert splicer would be ready to begin wiping the second end of his horizontal joint.

Making a splice with a HARGIS JOINT is so easy that you don't need a cable platform. There is no need for a drip pan to catch the paraffine, because the HARGIS JOINT is submerged in the paraffine pot, and there is no waste. The moisture has to go out. No uncertainty.

SEND IN YOUR ORDER TO-DAY

W. N. Matthews & Brother

Manufacturers of Patented Money Saving Specialties.

214 North Second Street **ST. LOUIS**

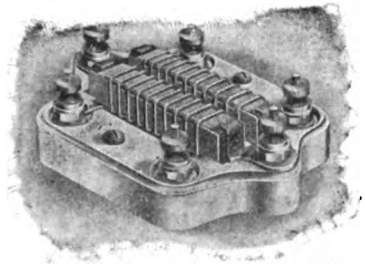
Branches: New York and San Francisco.

"Leave not that to chance which foresight might provide for or care prevent."

"Arrester"

IT-BEATS-THE DEVIL!

"Arrester"



Mister Lightning Never Passes the Sumter

DON'T YOU WANT A BULLETIN?

Tel. Mfg. Co.
Sumter, S. C.

"Arrester"

MASON MULTI-DISCHARGE LIGHTNING ARRESTER

Patented August 9, 1904.

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From Shops and Factories

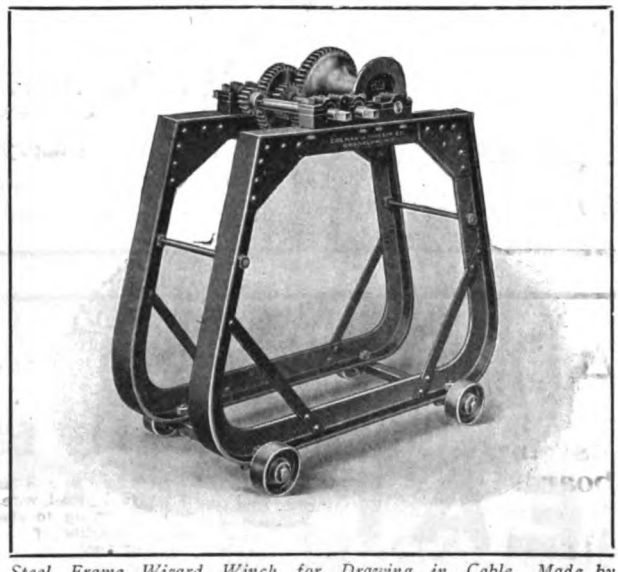
A STEEL FRAME CABLE WINCH.

EXTREME durability was the object sought in the design and construction of the cable winch illustrated on this page. At the same time it is so made that its weight is not too great for convenience, and it occupies a very small amount of space.

The framework is made of wrought steel, and upon this are mounted the drum and gearing. All parts are designed strictly for the best efficiency in pulling in telephone cable, and the manufacturers report that in actual service it has shown itself well worth the excess in price above the cost of a wooden frame winch.

Further information about this winch and other appliances for handling various classes of construction may be obtained by writing to the Colman J. Mullin Co., 430 Kent avenue, Brooklyn, N. Y.

CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., now has every department in its new factory running up to the limit. The company reports that the demand for its telephone apparatus is increasing so rapidly, particularly in the West, that it has been decided to open in the near future a branch office and warehouse in Chicago, which with its Kansas City, Mo., branch will take care of the Western business.



Steel Frame Wizard Winch for Drawing in Cable, Made by Colman J. Mullin Co.

DEAN HARMONIC CONVERTERS USED WITH COMMON BATTERY OR MAGNETO BOARDS.

THE successful use of Harmonic Converters manufactured by the Dean Electric Company of Elyria, Ohio, in four and eight party selective ringing through common battery boards is said to have been thoroughly demonstrated by scores of satisfactory installations. One of the latest contracts taken by the Dean Company is in favor of the Greene County Telephone Company for a common battery multiple board at Waynesburg, Pa. This board has a present equipment for five hundred subscribers lines and an ultimate capacity for 2,000 lines arranged for four party individual indicating keys on each cord circuit, and equipped with duplicate harmonic converter ringing machines.

The ability to use harmonic converters economically with magneto boards has been but lately demonstrated. The Dean company reports that it has so perfected its converter that it may be easily operated by dry cells. This brings harmonic selective ringing within the reach of the smaller operating companies and orders are coming in for this type of equipment. Cambridge Electric Telephone & Telegraph Company of Cambridge, Pa., has ordered a three section magneto board of an ultimate capacity for four hundred and fifty subscribers lines. This board is equipped with four party individual indicating keys on each cord circuit, operated by the Dean harmonic converter with power from a battery of dry cells.

THE LEEDS & NORTHRUP COMPANY, 4901 Stenton avenue, Philadelphia, Pa., has just issued a new catalogue, which, in addition to showing a very complete line of high grade standard electrical measuring instruments, which have been for some time on the market, contains descriptions of several new pieces of apparatus.

Among these may be mentioned the "Dial Portable Testing Set," which is made up for those who prefer a sliding dial to a plug arrangement for manipulating resistances. These instruments are sold under an absolute guarantee that there will be no errors due to contact resistance due to poor construction of the sliding brushes.

Another new instrument is a "Fault Finder," designed to locate faults by such simple methods that practically no calculation is required. The instrument is intended for use by cable splicers or other men without training in electrical measuring. It may be used to measure conductor resistance, to pick out a faulty wire in a cable and make a rough measurement of the fault resistance, and to locate other faults which are liable to occur in practice.

The portable telescope galvanometer is another instrument which appears for the first time in this catalogue. This galvanometer, although the combination of measuring instrument and telescope is very compactly arranged, has a sensibility such that one volt through one megohm would cause a scale deflection of five to ten divisions. This instrument is especially recommended for the measurement of insulation resistances.

THE WIRE & TELEPHONE COMPANY OF AMERICA, Rome, N. Y., reports that the new wire drawing mills which have been under course of erection to replace those destroyed by fire in February are now practically completed. The company is now installing machinery, and will be operating the mills in a few days. As a result of the fire loss, this company has taken advantage of the opportunity to install the latest and most improved machinery, and has spared no expense to provide a thoroughly well equipped modern wire drawing plant. During the interval since the fire the company has not ceased operations in its manufacturing plant devoted to the manufacture of magnet wire, rubber covered wire and telephones, having had its copper drawn by other mills to take care of its own requirements and those of its customers.

GRAND RAPIDS EXCHANGE ORDERS MORE AUTOMATIC EQUIPMENT.

THE Citizens' Telephone Company a few days ago gave an order to the Automatic Electric Company of Chicago, for 1,000 additional switches, to take care of the expected normal growth in its telephone service during the next nine or ten months, and also made arrangements for changes in its present switches, so that it will have opportunity to increase the capacity of its plant by 10,000 more telephones. This will be done by abolishing the 3,000 group of numbers and substituting a 30,000 series, the present switches on the 3,000 series to be replaced by new ones containing the first, second and third selectors. It is only a matter of a few months at the present rate of increase when the capacity of the switches with merely first and second selectors and connector will be exhausted, so the company has been forced into making this substitution. To-day the records of the company show that it has 8,739 telephones in use, an average increase of 100 instruments a month. The company expects that this rate of increase will continue for some time to come, and is preparing to handle it.

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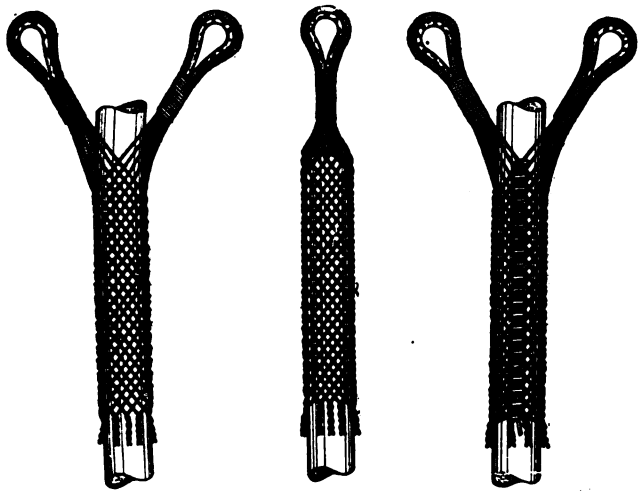
NO EFFORT AT ALL

IS REQUIRED TO ATTACH

The Universal Cable Grip

SECURELY TO ANY CABLE



DOUBLE EYE. SINGLE EYE. SPLIT GRIP.

Unequaled by any device on the market for pulling cable. Pulls cable in and out of ducts, pulls up slack and is generally useful wherever cable is being handled.

Send us your name on your letter head and we will give you an opportunity to investigate the worth of Universal Grips without cost to you.

WRITE TO-DAY

UNIVERSAL CABLE GRIP CO., Syracuse, N. Y.

No Question About It

The world renowned "1900" dry battery has proven by the most severe test a battery can be subjected to that it is without equal for strength, durability and service.

Everything in battery service depends on the careful manufacture of the battery; 19 successful years in battery building has been our schooling. Reason enough why the "1900" is the BEST made?

The Nungesser Electric Battery Co.

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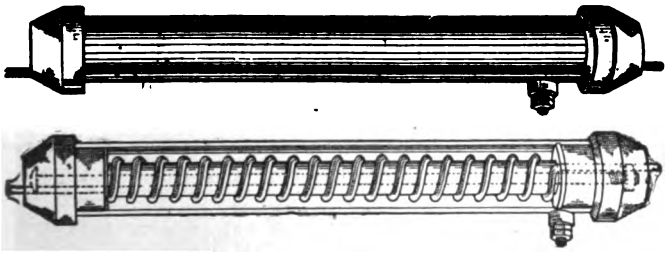
For Your Lines, Instruments and Switchboards

SKY ROCKET LIGHTNING ARRESTERS



Are the safest and least costly insurance possible to secure.

The fifty inches of coiled discharge surface keep the static charge below the striking point, thus assuring immunity from lightning burn-outs.

SAVE THEIR COST EVERY STORM

SEND YOUR ORDER TO-DAY

CHANCE MANUFACTURING CO.

CENTRALIA, MO.

PREMIER BB STEEL CORD

CONDUCTORS A-B are made of special prepared hard drawn steel wire, insuring flexibility and durability. Owing to the high resistance of the steel wire, a winding of copper wire is applied to reduce the resistance.

INSULATION C-D. Each conductor has a triple insulation, the first consisting of a serving of silk, the second of a serving of cotton, and the third a braiding of waxed cotton.

FORMATION. Both conductors are formed into a concentric spiral as illustrated by cut. Over the spiral is applied a braiding of cotton on the longitudinal effect for the purpose of taking up any possible stretch in the cord.

RE-ENFORCEMENT SPRING made of very high grade steel wire is inserted in the hollow of the cord at PLUG END for the purpose of doubly re-enforcing the cord at the end that is subject to the greatest usage. The spring is inserted in a manner that prevents the conductors from being thrown out of alignment, making it almost impossible to break the cord at the PLUG END—regardless of how the operator may insert or jam it into the switchboard jacks.

OVERALL BRAID E-F. Consists of special high-graded linen thread boiled in wax. A double braiding is applied at the plug end for the re-enforcement.

Let us quote you our new prices. They're in your favor.

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton St., Chicago

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Good News—and It's All New

NEW COMPANIES.

OAKLAND, IA.—The Botna Valley Farmers' and Merchants' Mutual Telephone Company, of Oakland, has filed articles of incorporation. The capital stock is given at $15,000, divided into shares of $40 each, and provision has been made that $4,000 of this amount shall be fully subscribed, and that twenty-five per cent. of the amount shall be paid at the time the corporation begins business. Among the incorporators are J. L. Spalti, president; J. N. Maguire, vice-president; George B. Clark, secretary; W. W. McCrory, treasurer; Titus Fehr, L. C. Hannah, D. S. Pleak, B. D. Orton, P. F. Schoening, William Whitney, William Olff, Michael Mullen, W. A. Potter, Robert Miller, John A. Bates, D. O. Cole, W. D. Harlan, W. S. Matthews, Thomas J. B. Turner, Julies Guderjon and L. O. Guderjon.

SERGEANT BLUFFS, IA.—The Sergeant Bluffs Telephone Company has been incorporated with a capital stock of $20,000. Among the incorporators are A. J. Westfall, George S. Parker, R. D. Westfall, William Milchirst and J. A. Duncan.

HORTON, KAS.—A new Independent telephone company, to be known as the Horton Mutual Telephone Company, has been organized by prominent business men of this city.

PEMBROKE, KY.—Articles of incorporation have been filed by the Pembroke Home Telephone Company of this city. It has an authorized capital stock of $40,000, and the incorporators are R. E. Cooper, Gustave Hirsch and Frank G. Hoge, of Hopkinsville; Frank P. Gill, of Elkton, and K. P. Cross, of Pembroke.

WASHINGTON, ME.—The Washington Telephone Company, of Washington, has been incorporated with a capital stock of $1,000, and the following officers elected: President, Charles Lynch; vice-president, B. K. Ware; general manager, W. F. Hatch; treasurer, W. E. Overlock; directors, W. O. Luce and W. W. Light.

UNION, N. D.—The Union Rural Telephone Company, of Union, N. D., has been organized by the farmers of the southern part of Grand Forks county, and the following officers and directors elected: H. T. Ellerson, president; George Florence, vice-president; Peter Thornsedt, secretary; John Arndt, treasurer; Hans Thompson, Simon Domstad and Sam Olson, directors.

GEARY, OKLA.—The Marple Telephone Company has filed articles of incorporation. Its capital stock is given at $600, and the following directors have been elected: Byron Baker, A. C. Gilrune and A. S. Schmyer, all of Geary.

TRIBBEY, OKLA.—Articles of incorporation have been filed by the Tribbey-Mardock Farmers' Union Telephone Company. It has a capital stock of $5,000, and the directors are E. M. White, J. J. Roberts, W. L. Lean and Philo Beanlart, of Tribbey; E. F. Henry, of Mardock; J. S. Buchanan and W. J. Norman, of Norman.

MONTPELIER, VT.—The Southern Vermont Telephone Company has filed articles of incorporation with the secretary of state at Montpelier, and contemplates the construction and operation of a telephone system in Windsor, Windham and Bennington counties. It has a capital stock of $5,000, and among those interested in the new enterprise are Forrest A. Richmond, of Woodstock; Winfred A. Perkins, of Bethel; H. P. Clark, of Woodstock; Francis C. Whitman, of Boston; L. Glenn Lyman, of Hartford, and Harry W. Hoye, of Woodstock.

TACOMA, WASH.—An Independent telephone company, whose intention it is to establish connections between Tacoma, Gig Harbor, Sylvan, Fox Island, McNeils Island and Anderson Island has been organized by the business men of Tacoma and incorporation papers filed. It is to be known as Island Empire Telephone and Telegraph Company. The capital stock is placed at $20,000, and among those interested in the enterprise are F. E. DeParcq, C. S. Barlow, Edwin Miller, J. H. McFarland, Tacoma, and G. C. Pierce, of Sylvan, Fox Island.

HINTON, W. VA.—Articles of incorporation have been filed by the Hinton, Clayton and Glenray Telephone Company, which intends to build and maintain telephone lines. It has an authorized capital stock of $5,000, and the incorporators are J. S. Graham and D. S. Ballangee, of Clayton; T. P. Housby, E. C. Flint and J. H. West, of Glenray.

PRUNTYTOWN, W. VA.—The Pruntytown Telephone Company, of Pruntytown, has been incorporated with a capital stock of $9,000. The incorporators of the new company are H. B. Scranage, R. H. Currey, C. B. Kinsey, G. W. Giles, C. O. Laren and others, of Grafton.

EAU CLAIRE, WIS.—A mutual telephone company, to be known as the Cary Telephone Company, has been formed by the farmers living in the vicinity of Eau Claire. John Eddington has been named as president of the new company, and the following are among the incorporators: M. R. Allen, Eau Claire; B. Whipple, P. Telpherd, Melvin Pierce, O. P. Moses, C. G. Spragg, M. B. Luffin, Joseph Spiely, Richard Kopp, H. B. Wilson, Fred Hatch, George B. Fuller, Burt Rice, A. O. Brice, William Ness, John B. Norris, A. Norris, Lee Wallace.

CLEAR LAKE, WIS.—The Clear Lake Telephone Company, with a capital stock of $50,000, has been organized by J. C. Sexton, J. S. Griffin and others.

EVANSTON, WYO.—The Utah-Wyoming Independent Telephone Company has been organized under the state laws of Utah, and the following officers elected: Wesley K. Walton, president; John F. Spencer, secretary. The new company is negotiating for the purchase of the stock of the Unita-Rich Telephone Company, which operates lines from Evanston down the Bear River to Cokeville.

FRANCHISES.

WILLIAMSBURG, MASS.—An extension of its franchise in Leeds, Florence and Center has been granted to the Citizens Independent Telephone Company of Williamsburg.

AMARILLO, TEXAS—A thirty year franchise has been granted to H. H. Davenport & Company, of Hillsboro, on the condition that a modern telephone system to cost not less than $100,000 is to be installed.

FINANCIAL.

SIOUX CITY, IA.—The New State Telephone Company has amended its articles of incorporation increasing its capital stock to $1,000,000. Half of the stock is preferred, bearing a seven per cent. dividend, and the other half is common.

NEVERSINK, N. Y.—The Neversink River Telephone Company expects to declare a ten per cent. dividend at an early date.

CARDENAS, N. C.—The Cardenas Telephone Company has increased its capital stock from $1,000 to $3,000, and arrangements have also been made to connect with the Capitol City Telephone Company at Raleigh, N. C.

ELECTIONS.

FISHER, ILL.—At a recent meeting of the newly organized Farmers' Telephone Company the following officers were elected: President, L. D. Oliver; secretary, J. W. Boyd; treasurer, J. O. Sayers. It is the intention of the company to commence the construction of its lines very soon.

SCOTTSBURG, IND.—At a recent meeting of the stockholders of the Scott County Telephone Company the following directors were elected: Irvin McCaslin, president; Mark Storen, vice-president; John Montgomery, secretary; J. Ezra Thomas, treasurer; Frank Park, general superintendent; Chas. Guernsy, manager. The system of this company, which was entirely destroyed by fire, is now in good working order again.

WHITEHALL, N. Y.—At a recent meeting of the directors of the Co-Operant Telephone Company W. D. Gaul was elected vice-president and general manager.

WAYNESBURG, PA.—The officers of the Green County Telephone and Telegraph Company, which has recently been granted a charter covering the consolidation of the Carmichaels and other Independent lines, are W. H. Bailey, Waynesburg, president; Challen W. Waychoff, treasurer; T. B. Lee, Pittsburg, secretary; directors, W. H. Bailey, C. W. Waychoff, T. B. Lee, S. S. Bayard, Thomas Hughes, Rices Landing; J. N. and W. S. Scott, Jefferson township. The work of establishing an exchange and putting in conduits in this city is progressing rapidly.

MEMPHIS, TENN.—At a meeting of the stockholders of the Memphis Telephone Company the following directors were elected: A. B. Thrasher, M. J. Richmond, B. A. Adams, Robert M. Trimble, U. J. Howard, Geo. A. Howard and Harvey Myers.

ROANOKE, VA.—The following officers have been named by the Roanoke & Bedford County Telephone Company, of Roanoke, Va.: President, W. E. Wolfenden; vice-president and general manager, R. L. Deering; secretary, S. P. Harris; treasurer, J. W. Meador.

BELOIT, WIS.—The officers of the Beloit Telephone Company are M. J. Ward, president; W. H. Grinnell, vice-president; Alfred Slater, secretary and general manager; directors, C. B. Salmon, W. W. Lufkin.

MISCELLANEOUS.

PEKIN, ILL.—The Citizens' Telephone Company, which purchased the

WANTED - SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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National Pole Company

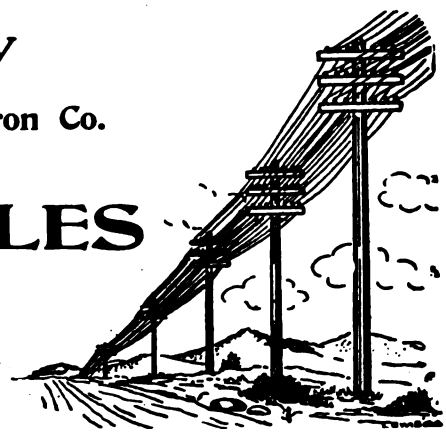
SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from
Maine to Washington



MICHIGAN WHITE CEDAR POLES

We have a large stock of White Cedar Poles of all sizes, concentrated at a point on the D. & M. R. R. in lower Michigan, from which we can make prompt deliveries. The location of this stock offers exceptional facilities for shipments to all points in Ohio, Indiana, Southern Michigan and the Eastern States. Write us for delivered prices on any size for immediate shipment.

KELLOGG SWITCHBOARD & SUPPLY CO.

CHICAGO, ILL.

CABLE REEL WHEELS

Anything in the way of pole line hardware for telephone and telegraph construction material.

HALLETT IRON WORKS

92-96 West Polk Street CHICAGO, ILL.

1st TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

Our Price is Right

INTERNATIONAL TEL. MFG. CO.
Harrison and Clinton Sts., Chicago

ORANGEBURG

Fibre Conduit

FOR UNDERGROUND SYSTEMS

WRITE FOR CATALOGUE

The Fibre Conduit Company

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Boston Office, 110 State St. Chicago Office, 1760 Monadnock Bldg.

PIERSON, ROEDING & CO.

SAN FRANCISCO, CAL. LOS ANGELES, CAL. SEATTLE, WASH.

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Good News—And It's All New

Pekin Telephone Company, has been granted articles of incorporation at Havana, at which place it has an exchange. The new company has increased its capital stock from $75,000 to $200,000, and Charles Turner, of Havana, has been appointed a trustee.

CAPE MAY, N. J.—The Keystone Telephone Company has purchased the local system at Cape May, and incorporated it with the Philadelphia plant. Improved connections with the latter city are to be made.

NORTH PLATTE, NEB.—The plant of the North Platte Telephone Company has been acquired by Mr. Warner of Lexington.

AUSTIN, TEXAS—The Home Telephone Company, of Los Angeles, has acquired a number of long distance lines in Texas, and local Independent telephone exchanges at Fort Worth, Ennis, Waxahachie, Cleburne and a number of other places. It is intimated that the company will expend in the neighborhood of $5,000,000 in the extension of the system, which is to be operated in competition with the Bell company.

CLARENDON, TEXAS—The Independent telephone exchange, in which F. H. Besaw is interested, is soon to become the property of Loveland, Col., capitalists. It is the intention of the new owners to form a stock company, and greatly improve the plant.

ST. ALBANS, VT.—Considerable damage was done to the lines of the Franklin County Telephone Company during a recent storm.

VERNON, B. C., CAN.—A private telephone system is being installed at Vernon by Mr. Stevens.

PERSONAL.

E. B. DENNISON has recently been elected general manager of the Home Telephone Company at Clarksville, Tenn.

GORDON JOHNSON has been appointed manager of the exchanges of the Wisconsin Telephone Company at Delavan and Elkhorn, Wis.

J. L. McDOWELL has assumed management of the exchange of the Commercial Telephone Company at San Marcos, Texas.

C. E. ROWE has been appointed manager of the exchange at Ft. Worth, Texas, by the Southwestern Telephone & Telegraph Company.

With the Builders

BERKELEY, CAL.—The Home Telephone Company, which has secured a franchise at this city, has commenced work on its system.

NEZ PERCE, IDAHO—It is the intention of the Nez Perce Co-Operative Telephone Company to make many improvements in its system. New lines are to be built from Vollmer to Reubens, and its plant to be made thoroughly up-to-date in every particular.

HILLSBORO, ILL.—A modern telephone exchange building is to be erected by the Montgomery County Telephone Company at this city, in which its system is to be installed.

MIDDLETOWN, ILL.—A new telephone exchange, which is to be owned and managed by S. A. Tyler, of Harness, is to be installed in Middletown.

FT. WAYNE, IND.—To take care of its rapidly growing business in this city, additional switchboard equipment has been added by the Home Telephone Company.

FRANKFORT, IND.—Among the improvements being made by the Burrows Telephone Company is the construction of a new exchange building at this city.

LAFAYETTE, IND.—New exchange equipment is being installed in this city by the Lafayette Telephone Company, and the plant made up-to-date in every particular.

PARKE, IND.—The Vivalia Telephone Company, Vivalia (P. O. address Parke), contemplates the erection of two new trunk lines; one from Vivalia to Greencastle, and the other from Clinton Falls to Vivalia.

ROCHESTER, IND.—Three new farmers' lines are being erected by the Rochester Telephone Company, and its system otherwise improved.

RUSHVILLE, IND.—It is estimated that about $55,000 will be expended by the Independent telephone company in this city in the installation of its new system.

WARRINGTON, IND.—Among the improvements planned by the Farmers' Mutual Telephone Company at Warrington, are the erection of a new exchange building and the installation of new switchboard equipment.

DIKE, IA.—Among the improvements in its plant to be made by the Corn Belt Telephone Company are the construction of a new metallic line between Dike and Cedar Falls; one between Dike and Grundy Center; one between Renbeck and Dike, and the installation of a new switchboard.

ROCKWELL CITY, IA.—Many improvements in its system at Rockwell City are being made by the Central Mutual Telephone Company.

NEOSHO FALLS, KAS.—Connections between LeRoy and Neosho Falls have been established by the LeRoy Telephone Company.

NORTON, KAS.—It is the intention of the Farmers' and Merchants' Telephone Company to expend about $10,000 in the installation of new equipment.

SALINA, KAS.—A number of rural lines out of Gypsum City are to be erected by the Salina Telephone Company, which already has a very complete rural route system.

LOUISVILLE, KY.—Many improvements and extensions in its system are under consideration by the Louisville Home Telephone Company.

LITCHFIELD, ME.—A new line north of Litchfield Plains is being erected by the North Eastern Telephone Company.

MONROE, ME.—The lines of the Farmers Telephone Company are being extended in nearly all parts of Monroe.

WEST APPLETON, ME.—The West Appleton Telephone Company is extending its lines and otherwise improving its system.

GRAND RAPIDS, MICH.—Arrangements are being made by the Cass County Home Telephone Company for the construction of a toll line from Grand Rapids to Cassopolis, and from that city to Ft. Wayne, South Bend and Indianapolis, east to Detroit and Toledo, and west to Chicago, Cassopolis to be the switching point.

PONTIAC, MICH.—About $136,000 is to be expended by the Oakland Telephone Company in this city. It is its intention to rebuild its exchange and its lines, new cables are to be added; a new switchboard installed, and the plant made thoroughly modern in every particular.

CLAYTON, MO.—Owing to its increased suburban business, it is the intention of the Kinloch Telephone Company, of St. Louis, to install five additional trunk lines in its exchange at Clayton.

KEARNEY, NEB.—The Farmers' Home Telephone Company has installed a new switchboard, and is otherwise improving its plant in order to take care of its rapidly increasing business.

STERLING, NEB.—The Johnson County Telephone Company is installing its system in Sterling.

INTERLAKEN, N. Y.—A new switchboard is being installed by the Home Telephone Company at this city, and its system generally improved.

MORAVIA, N. Y.—The Farm & Village Telephone Company is building a line from Moravia to Cascade. It is the company's intention to extend its lines to connect with the system through Venice and Scipio.

MT. UPTON, N. Y.—At a recent meeting of the directors of the Unadilla Valley Telephone Company it was decided to build a trunk line to connect South New Berlin and Mt. Upton with Oxford, and arrangements are to be made for connections over the Marquis line into Norwich. A trunk line is also to be built to Rockdale from Mt. Upton, and the entire plant of the company made thoroughly modern in all respects.

THOMASVILLE, N. C.—The Thomasville Telephone Company is planning many extensions in its system to take care of its rapidly growing business.

GRANVILLE, N. D.—A new exchange building is to be erected by the Union Telephone Company of this city.

LANGDON, N. D.—Among the extensions planned by the Langdon Telephone Company is the construction of a number of rural lines.

OBERON, N. D.—Work on the construction of its system in this city is now under way by the West Antelope Telephone Company, and connections are to be established with the telephone lines at Scandia.

BEDFORD, PA.—New lines are being erected by the Friends Cove Telephone Company.

LEWISTON, PA.—Many improvements in its plant are being made by the Commercial Telephone Company.

EL PASO, TEXAS—Work on the construction of its line from El Paso, Texas, to Engle, N. M., is being carried on by the Silver City, El Paso and Southwestern Telephone Company.

GALVESTON, TEXAS—The Galveston, Houston and Henderson R. R. is considering the advisability of installing a telephone system on its line between Houston and Galveston.

TWISP, WASH.—It is expected that the forestry department will build a telephone line from Twisp to the county seat town.

WESTON, W. VA.—To take care of its rapidly increasing business, the plant of the Beechley Telephone Company is being considerably enlarged.

ETTRICK, WIS.—The lines of the Ettrick Telephone Company are being extended from Ettrick to Galesville.

HUSTISFORD, WIS.—In addition to the new lines which are being built in Hustisford by the Eureka Telephone Company, it is its intention to build new lines out of the village. One line is to be built to Hooker, another to Seefeld, one to Watertown and another to Wooland.

KIRTLEY, WYO.—Connections between Kirtley and Harrison, Neb., are to be established by the Kirtley Telephone Company.

UNDERGROUND.

RUSHVILLE, IND.—The Independent Telephone Company in this city expects to place a number of its wires underground.

PONTIAC, MICH.—Considerable conduit work is to be done by the Oakland Telephone Company in the rebuilding of its system at this city.

BRISTOL, N. H.—Considerable conduit work is being done by the Home Automatic Telephone Company in this city.

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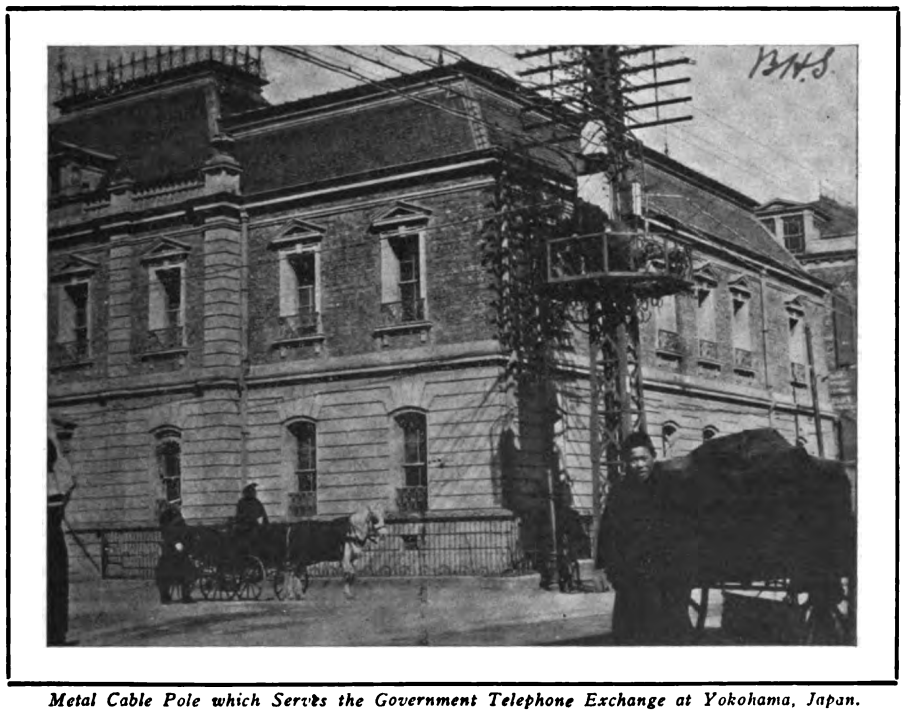
VOLUME XVI. SATURDAY, JULY 20, 1907. NUMBER 3.

Observations of a Telephone Man in the Far East

By B. H. Skinner.

AMERICA must be admitted everywhere to lead the world in the design of telephone apparatus and methods of installation, for even in Japan the current practice is modeled after American standards. Construction methods are very similar to those in vogue here, and the apparatus for subscribers' stations and exchange equipment is, as a rule, strictly of American design.

While on the way to Manila, to take up the installation of new exchange equipment for the Philippine Islands Telephone Company, the writer, with his companions who were to assist in the work, had an opportunity to make a brief visit to a Japanese exchange while the steamer on which they had taken passage was lying over for a short time at Yokohama. When it came time to visit the exchange, although aware that once within the doors they would be confronted by things of familiar appearance, the remarkable difference in the method of approaching the operating room made an interesting impression upon the visitors. In fact, had three men attempted to enter an American or European operating room in the same costume as that to which the visitors were compelled by custom to modify their apparel before stepping upon the floor of the Japanese exchange it is probable that it would have caused a rather serious interruption to the service. It would have been hard to keep the operators from looking around and smiling, no matter how stringent the rules against such a procedure. As it was, perhaps, the operators had no interest, but the self-conscious feeling of the visitors may be imagined! The members of the visiting party, having made their wants known, were passed from one official to another, and finally at the door of the operating room were invited by an attendant to take off their shoes. This they did, being aware that it was a custom of the country to leave shoes at the door before entering a room, and stepped upon the polished floor of the operating room in their "stocking feet."



Metal Cable Pole which Serves the Government Telephone Exchange at Yokohama, Japan.

Extending along one side of the room was a long line of Japanese operators, young women, seated at a switchboard arranged in a single line, something after the plan adopted in many small cities in America. It occupied only one side of the room. The six sections of lamp signal multiple board presented no particularly interesting or original features to one who is familiar with American practice, except from the fact that boards of American type should be found in this distant country where the customs of the people are so widely different from those which prevail where this switchboard was originally made.

On the other side of the room, arranged parallel to the local board, were four sections of toll board, and these, too, were of a well known American type. The chief operator had her desk so located as to enable her to supervise the operators on both lines of the board, a single chief taking care of both toll and local business. It was very interesting to watch the little operators at work handling the cords and operating the ringing and listening keys as rapidly as any operators in the world, probably, yet all talking in Japanese, which was a language absolutely incomprehensible to the visitors. While the impression was gathered that although the standard challenges of "What number," "Busy," etc., which prevail in America, were not used, the substitutes were very satisfactory, and the business was carried on efficiently and in a manner to suit subscribers. Subsequent visits to the terminal room and batteries, and to other apparatus necessary for the operation of the exchange, confirmed the previous impression of neatness, and also the continued prevalence of American design, although the actual manufacture of the greater part of this plant was carried on in Japan.

In connection with this exchange there was a rather extensive underground system, which served the central portion of the city, the lead cables for this district entering the exchange building underground. One of the most interesting and novel things seen during this visit was the massive metallic cable pole.

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Telephone Transmission Measurements*

By B. S. Cohen and G. M. Shepherd.

FOR measuring currents the barretter and the thermo-galvanometer have been used. The barretter, otherwise termed the bolometer, is a device for measuring small alternating or fluctuating currents. It consists of a conducting wire or filament, which has a high temperature coefficient and a small mass, so that the small currents will appreciably raise the temperature, and thus alter the resistance. Prof. Kennelly used barretters made of very fine platinum wires. Owing to the extreme deli-

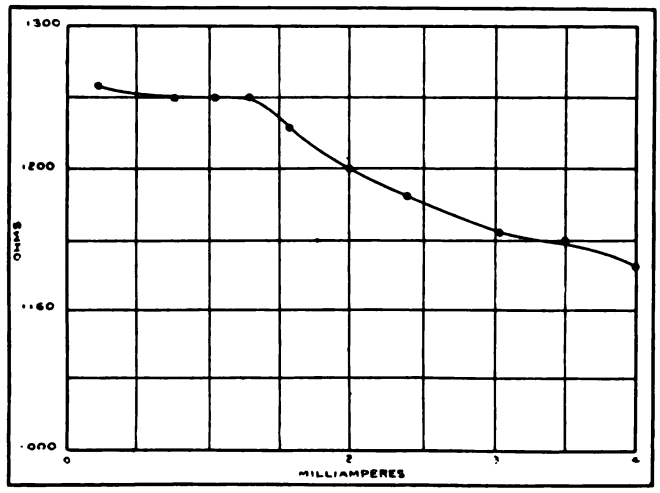

Fig. 12. Curve showing relationship between current and resistance in ordinary 24-volt lamp.

cacy of these wires, Dr. Hammond V. Hayes, of the American Telegraph and Telephone Company, carried out investigations to discover a barretter more suitable for work outside the laboratory. He found that small low-voltage telephone switchboard lamps gave satisfactory results, and this has been confirmed by experiments carried out by us. The best lamp we have found for this purpose is a special pattern 24-volt curl filament lamp for telephone switchboard use. The curve (Fig. 12) shows the relationship between the current and the resistance using this lamp. Following the usual law, the greatest resistance variation with these carbon filaments occurs when using small currents. Experiments have been tried to increase the sensibility of the filaments by over-running the lamp for some hours, and thus reducing the mass; but although great sensibilities have been obtained, it was found impossible to make a number of barretters exactly similar to one another. The filaments always reduce at their weakest point, and in consequence, although two filaments could be obtained having the same sensibility, the time of response to a change of current varied, and with the null method of working barretters described further on this gave rise to trouble.

Null Method of Working.

The arrangement of barretters, shown in Fig. 13, has been adopted after considerable experiment. This arrangement enables

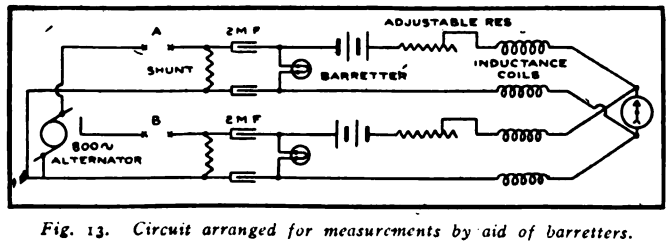

Fig. 13. Circuit arranged for measurements by aid of barretters.

measurements of apparatus and line impedance, capacity, etc., to be carried out, the result being obtained in actual ohm values and with very little more trouble than that involved in taking an ordinary resistance measurement with direct current. The figure shows a source of alternating current such as a sine-wave alternator connected to two branch circuits, in one of which at variable resistance box, A, is inserted. The other arm has the apparatus or line to be measured inserted at B. The barretters are connected through adjustable resistances and batteries to the galvanometer, which can be of any pattern. The shunt, which for general work can be varied from 10 to about 500 ohms, helps to eliminate errors due to the impedance of the barretter circuits. The barreters are first balanced in resistance by the adjustable resistances until the galvanometer indicates no deflection. The alternating current is then applied, the circuit being through the condensers and round the barretters. This current is stopped from passing from one branch into the other, via the galvanometer, by the four choking coils. When the resistance box in A is adjusted so that no deflection is indicated on the galvanometer, then the resistance unplugged in A, after making allowance for the impedance of the shunted barretter circuits, represents the impedance of B, and if the two barretters are not exactly similar, a second reading can be taken with A and B reversed and the mean taken. Variations in barretter resistance caused by temperature changes have no effect on this arrangement, as the barretters are fixed close together and compensate each other.

Corrections to be Applied when Measuring Effective Resistance, Inductance, or Capacity, by the Barretter.

In measuring inductance, let R be the balancing resistance unplugged from the box, and r the total resistance of barretter

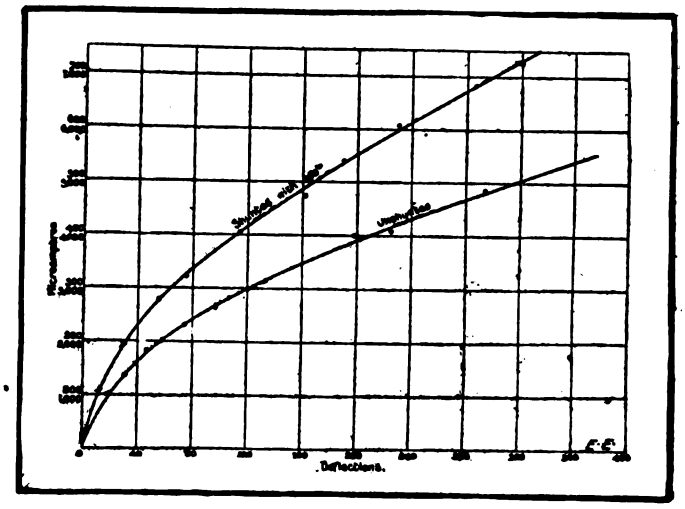

Fig. 14. Calibration curve, used in connection with measurements by the deflectional method.

and shunt, and R_0 the effective resistance of the apparatus measured (includes true resistance and iron losses). Then

$$I^2 = R^2 + 2r(R - R_0),$$

provided that the impedance of circuit on galvanometer side of barretter is high enough to be negligible, and that both circuits are fed with the same voltage. From the equation it is evident (1) if r is small enough, R is the true impedance (in no other case is this so); (2) in some cases R_0 will be small compared with the reactance, and then $I^2 = R^2 + 2rR$; (3) by varying r and taking (two) readings it is possible to eliminate I and obtain R_0. Thence the impedance and inductance can be obtained. By taking $x r_1 = r_2$, then

$$R_0 = \frac{R_2^2 - R_1^2 + 2r_1(xR_2 - R_1)}{2r_1(x - 1)}.$$

*Abstract from a paper read before the Institution of Electric Engineers, London, continued.

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In the case of condenser measurement the same formula will hold, R_0 being the effective insulation of the condenser. It includes dielectric losses. As a rule these are negligible, and we get

$$I^2 = \left(\frac{1}{c\,p} \right)^2 = R^2 + 2r\,R.$$

In the method of deflectional use only one barretter is actually used, the other being merely left in the circuit to balance the one used, both for atmospheric temperature variations and for resistance. One of the barretters is inserted in the circuit in

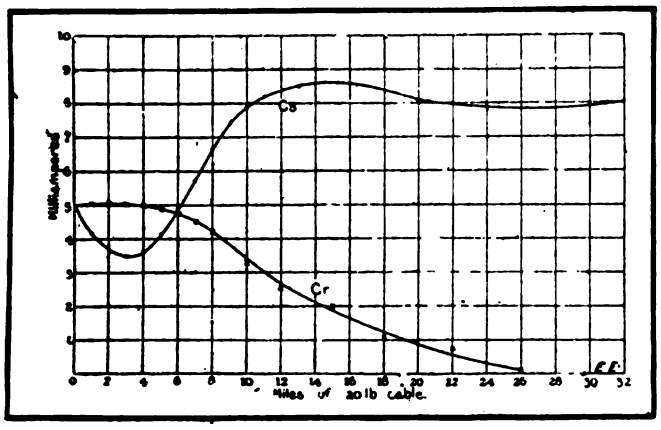

Fig. 15. Relationship between current at receiving and sending ends of lines of different lengths.

which the value of the current strength is required, and the change in its resistance due to this current causes the galvanometer to deflect. The instrument then becomes practically a hot-wire ammeter. It has this disadvantage—that it is somewhat difficult to calibrate. The simplest method of calibrating is to pass an alternating current through the barretter in series with a known variable resistance, and measuring the potential difference across the latter with an electrostatic voltmeter. Fig. 14 shows such a calibration curve. It will be seen that 60 micro-amperes correspond with 10 divisions deflection (about 5mm.). This is about the minimum measurable. The sensibility of the barretters used in relation to telephone currents is such that fairly small non-inductive shunts can be used to eliminate the effect of the barretter impedance. When testing telephone lines, ordinary telephone repeating coils, etc., can be inserted in order to give the ordinary terminal conditions met with in practice.

Thermo-Galvanometer.

Duddell's thermo-galvanometer has been used for current measurements. It has many advantages, and for deflectional

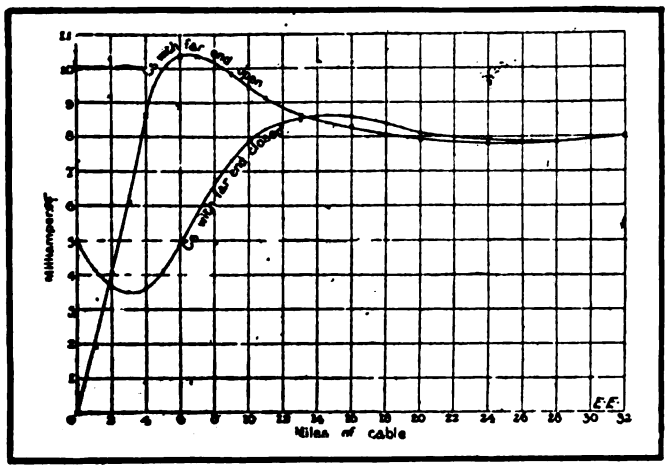

Fig. 16. Relationship between current at sending end of line when receiving end is opened and closed, for different lengths of line.

methods is probably unrivalled if the source of power is absolutely steady, but it cannot be satisfactorily employed with transmitters in circuit owing to their variability, even although the sound impressed is quite steady. The barretter is somewhat better for this purpose, as the mass of the filaments employed is greater than that of the heaters used in the thermo-galvanometer of the same relative sensibility, and consequently the time of response to a current variation in the thermo-galvanometer is smaller, and the sensibility to momentary disturbances thus much greater. This comparison, of course, only refers to the actual apparatus employed, and it should be quite possible to alter the time of response of the thermo-galvanometer, and thus reduce its sensibility to small disturbances. Some of the measurements referred to in the ensuing pages have been made with the thermo-galvanometer.

Current Measurements.

The relationship between the currents, *Cs* and *Cr*, at the beginning and end respectively of different lengths of telephone line can be readily measured with two barretters. As mentioned before, the relationship is complicated by the addition of terminal impedances at either end of the line. Fig. 15 shows this current relation plotted for various lengths of 20lb. conductor cable equipped with ordinary telephone instruments at either end. It will be seen that up to nearly six miles the received current is greater than the sending current. At about 20 miles the sending end current, which has up to this length been mostly increasing, has practically reached a constant figure, and is after this very little affected by any further increase in the length of line. The necessity for allowing for the action of the terminal apparatus is well emphasized by these curves. Fig. 16 shows the relationship between the current at the sending end of the line when the receiving end is open and closed for various lengths of line. The cable line used in this case had 20lb. conductors, and the line was terminated as before at either end by ordinary telephone instruments. It will be noticed that at about 20 miles and upwards the current flowing into the cable is practically unaffected by the opening and closing of the receiving end, and that this also happens at about two miles. The current used for the above tests was at 800 cycles, and practically sinusoidal in form.

Miles.	$\frac{Cs}{Cr}$	Cycles.	Cosh ($l\,a$).	Error.
		Far end short-circuited.		
5	1.065	792	1.0287	—3.5 per cent.
10	1.385	783	1.3740	—0.8 per cent.
15	2.310	763	2.3100	0.0 per cent.
	Far end closed through impedance			22 ohms 0.15 henry.
10	1.302	792	1.2400*	—4.8 per cent.

*This figure is the ratio of receiving end to sending end impedance.

Table Showing Relation Found Between Cs/Cr and the Hyperbolic Function Cosh (l a), Which is the Calculated Ratio of Cs to Cr.

Sinusoidal Current Producers.

Considerable difficulty has been experienced in obtaining a steady sinusoidal current of the frequencies required for telephone measurements. Arrangements depending on the reaction of transmitters and receivers have been tried, but without satisfactory results, as the waves are not by any means sinusoidal, and it is impossible to obtain the requisite steadiness. At present there appears to be no machine of a reasonably small size on the markets for which the makers will give a sufficiently definite guarantee at the frequencies required. As an example of the difficulty experienced, Fig. 17*a* is an oscillogram taken with such a machine of the wave-form on a non-inductive load. The suppliers were under the impression that this machine would give a closely sinusoidal wave-form. The machine used at present is a small inductor alternator, having an armature built up of ordinary slotted stamping, and gives a frequency of 800 cycles at 960 r.p.m. The output is small, but the wave is a very fair one, considering that no special shaping of the teeth was attempted. Fig. 17*b* is an oscillogram from this machine.

Wave Filter.

In order to purify the wave-form for very precise measurements the peculiar property of the periodic loaded line already

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referred to and mentioned by G. A. Campbell in his paper on loaded lines has been utilized. By building up an artificial line, consisting of four or five sections, each associated with a con-

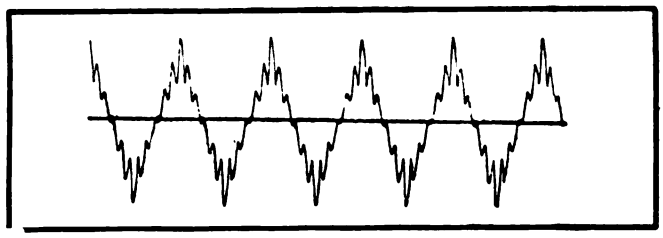

Fig. 17a. Oscillogram showing wave form of an alternating current machine.

denser, inductance and resistance coils, it is found possible to practically abolish all upper harmonics and to leave the fundamental frequency desired. A wave filter of this description requires no tuning, and is safe over a considerable range of frequency, but naturally introduces a certain amount of loss.

Power Measurements.

The measurement of the energy absorbed by telephonic apparatus under working conditions presents considerable dif-

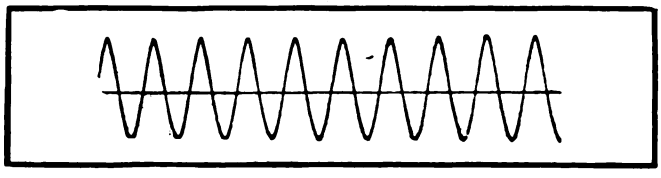

Fig. 17b. Oscillogram from machine giving very nearly a pure sine wave.

ficulty. The amount of energy is frequently exceedingly small, perhaps a few micro-watts only, and is always a very variable quantity. At the date of writing this paper we are unaware of any instrument directly indicating small fractions of a watt which could be included in the receiver circuit of a telephone without radically changing the circuit conditions. An ironless two-coil wattmeter of the requisite sensibility offers a series impedance of many thousand ohms, and is, of course, quite inadmissible on that account. A thermal method seems to be the only alternative, and the hot-wire voltmeter method, due, we believe, to Mr. M. B. Field, was employed with some success. The connections of this arrangement are shown in Fig. 18. The instrument used to indicate the vector sum and difference of

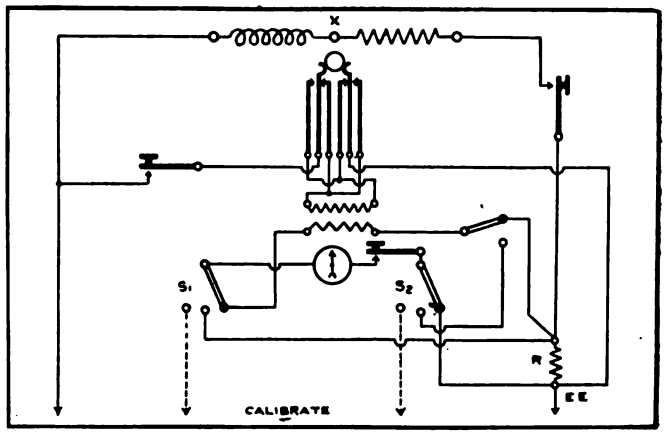

Fig. 18. Connections for measuring power with hot wire voltmeter.

potential was a Duddell thermo-galvanometer, operating with a 100-ohm heater. As only one such instrument happened to be available, it was necessary to employ a reversing switch to change the sense of the potential difference component. Switching arrangements were also provided to permit of current and potential difference measurements to be made independently, and to calibrate the galvanometer when required, by direct current.

(To be Concluded.)

Telephone Associations

By E. K. Hertford.

NO group of corporations in our country has ever enjoyed such rapid growth as have the Independent telephone companies. The organization of telephone associations is responsible to a large extent for the advancement made in the telephone systems, methods of doing work which have been practiced with material benefit, and the present use of high grade equipment. All members, especially those attending association meetings, have been urged to make greater progress in these directions, as success in the battle with their competitor requires a certain uniformity in their systems. It requires all material to be of a quality not only equal at first to the severe usage it receives, but to serve satisfactorily for a period of years necessary to justify the company in rebuilding from the depreciation fund.

Telephone associations have made strenuous efforts to establish that brotherly relation between their members similar to that which exists in many of our best fraternal organizations, and have thus, to a large degree, instilled a kindly feeling and friendship which is requisite to co-operation and perfect harmony. Such a feeling is necessary in all successful commercial lines, but more especially in our particular sphere, as many times a weak brother, discouraged by apparently overpowering competition, and lack of co-operation on the part of his neighbors, yields to the blandishments of the suave agents of monopoly when a word of encouragement or a very little assistance at the right time would cause him to stand firm and keep the chain complete.

Abstract from an address delivered before the West Virginia Independent Telephone Association at Wheeling, W. Va., May 9, 1907.

Telephone organizations bring together at stated times all the representative men in the industry, so that by the interchange of experiences and ideas they may assist one another in working out the best solutions to the various problems which arise from time to time, and decide upon the best methods of building and keeping up their plants. These discussions of methods of conducting their business are of incalculable benefit in strengthening and extending the great movement in which they are engaged.

The success and growth of the Independents is in a large measure due to the fact that they, as a whole, realize the value of organization, Though their organization has been far from perfect, and it is only recently that they have realized the necessity of bringing it to the highest efficiency, still they have always maintained some sort of an organization through which they were able to present a common front to the Bell attacks, which have been growing more insidious as the monopoly has become desperate owing to the continued success of the Independent companies. The Independent telephone business is unique, in that all of the companies constituting the Independent system have one common enemy.

It will be conceded by all that the most successful Independent companies are those who aid in maintaining good State Associations.

One has only to look at the results which companies in some states have been able to do through their organization to have the truth of this statement borne out. Ohio, for instance, has been compiling the most complete statistics of any state in the Union, making a report every six months, which is a wonderful help to the individual companies in creating confidence in the

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industry; Indiana does the same work; Southern California has the greatest development according to population of any place in the country. Iowa, Michigan, Pennsylvania and Nebraska have splendid clearing houses, which have been of great benefit in facilitating the interchange of toll business, maintained in connection with their state organizations. So it is organization that has given to the Independent telephone companies this increased efficiency, strength and power.

Good as are the results which have already been obtained there still remain many things which the telephone associations ought to do. They need to keep up the good work fairly under way, and this can only be accomplished by every stockholder in the telephone business lending his efforts in that direction, guided by officers and leaders worthy of the calling and positions they may be chosen to fill. Let every individual realize that he is a factor in the affairs of this business; let him fully understand that he owns a part of the $4,000,000 invested in West Virginia, or the many millions invested in the entire Independent interests of the country, as all companies are dependent upon one another. Let him understand that the business prospers as a whole in proportion to the activity of the individuals. Every man representing any interest in a convention should speak his opinion;—he may not think it amounts to much, but the very thought he presents may prick the dormant idea of another which will open up much to the general benefit.

Members of the associations should strive harder than ever to cultivate that friendly disposition by which alone they are able to justly settle differences, and must bear in mind that every telephone company cannot have its own way all the time and prosper. An idea of the rights of the other fellow should lead to the making of concessions, though temporarily they may cause the loss of a few cents or dollars, for profits come from many unexpected sources.

Every telephone company should become a member of its state association, and put itself in the harness to assist and be assisted when it is required. No company can afford to stand out and say: "I don't need your help, therefore will not assist in keeping the whole body together." That is not business, but short sightedness. For instance, a young doctor entering the field of practice green and inexperienced, as some of us are in our particular line, ignores the medical association, which is composed of the most learned and experienced doctors, consequently in not availing himself of advice and suggestions offered by many of his superiors, he is found lacking in ability, and not capable of attaining the best results. Later his mistake is realized, as his practice did not increase, nor hold. 'Tis then he cries for unity and brotherly love. But how will those constituting the society feel toward him?

There should be uniformity in the manner of conducting the telephone business; there should be unity in apparatus and operating material. By this the writer does not mean all should buy goods from the same factory, but that the factories should be required to standardize the goods, so each will be capable of comparing with the best, and turn out a product which will work in connection with other makes as well as with its own.

Every association should have a State Auditor for the purpose of keeping uniform all the companies' records and accounts, and establishing a system complete in every detail, yet as brief and simple as possible. Audits should be made either quarterly or semi-annually. This would not only create a good moral influence, but undoubtedly be more satisfactory, assuring the stockholders that all accounts are being kept correctly.

A State Engineer might well be employed to unify the operating department, and to inaugurate systems for the prompt and intelligent testing for the location of cable and toll line faults. A State Electrician might also be employed to oversee the installation of switchboards and such other apparatus so essential to good results, and as fast as possible, induce all the companies to get on a common basis of workmanship. When this is done,—or something else that will make all the companies in a state one great operating body,—they can compete for business and increase their earnings in tolls alone by 500 per cent., and until it is done their competitor will go on skimming the cream. Of course, the question of cost comes up, but so it does in every other line of business. Can the Independents, however, compete with their energetic rival unless they keep pace with it? Can the surgeon keep up his surgery without buying new instruments and learning to use them, or the farmer keep pace with his wide-awake neighbor by using a hand scythe or cradle to harvest his crops? Some say "Such expenditures will eat up our profits." To such the reply may be made: "Unless advancement is made in this line, it won't be long until you have no profits, for without the proper unifying of this part of the business and unless the Independents are able to handle their share of the toll business on a mileage basis they will have little toll to handle. Without proper connections and apparatus they cannot give good service. When a company fails a few times with one patron, he says "good bye" and goes to the competitor, taking others with him. Practically anything can be accomplished by concerted effort, even though it would be utterly impossible if attempted individually, and the whole topic resolves itself into the old adage, "United we stand, divided we fall."

A Way to Bring in Toll Collections Promptly at The End of Every Month

By Lynn W. Shipman.

DIVIDING subscribers into classes according to a plan practiced by the writer, and handling the accounts of each class in a special manner, has been found to be a good method of bringing in toll collections promptly at the end of each month. The accumulation of small toll accounts which is often found on the books of an exchange at the end of a quarter, and which frequently total a large amount, may be greatly lessened, and a more harmonious relation between the telephone company and subscribers maintained by the use of a very simple system of handling toll collections based on this idea.

There are usually a number of accounts of subscribers who have a small toll bill each month, which they do not consider large enough, or of enough importance, to pay until the quarterly rental is due. By letting them run until this period many disagreeable features are encountered which might otherwise be avoided. The average subscriber forgets the particulars of a message three months old, and will imagine there is some mistake about it; will claim that the over time charges are extortionate; the number of messages is incorrect, or that the message has been charged to the wrong station, or make some other one of the great variety of claims which have become familiar to collectors and managers. In such an event the subscriber may either refuse to pay the bill, or pay it under protest, which is bad for the harmony which should exist between a telephone company and its subscribers. Furthermore, it often happens that the toll business done by a local exchange is carried on over the lines belonging to a long distance company, for the use of which the local company is obliged to pay at the end of the month, and the local company then runs the risk of losing a portion of the tolls, to say nothing of putting itself practically in the position of advancing money to its subscribers, a practice which tends to cut down the net profits which the company

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derives from the toll business largely in the course of a year.

The most desirable manner of collecting tolls, and that which tends to keep everything running smoothly and all persons satisfied, is one which brings in cash for these bills each month. One very simple plan which aids in bringing about this result is to subdivide the toll bills into three classes, as follows:

First: The bills of business men, doctors, etc., whose toll business is small.

Second: The bills of those who come to the office and pay, or whose bills are large enough for a check or money order.

Third: Bills for small amounts, ranging from ten cents to one dollar.

In handling the first the writer has found it advantageous to make a personal call upon the people and have a social chat in relation to the service. He calls attention to the increased facilities for toll connections, and listens to any complaints the subscribers may have to make in relation to the toll service, and promises to give these complaints attention. This generally results in increasing the use of toll service by these people, who are usually quick to appreciate the advantages to be thus derived. Incidentally he collects the toll bill.

With the second class the method of procedure is simply to carry them along in the customary manner, presenting a bill the first of each month promptly, and following it up at an early date with a personal call of the collector, in case the bill is not properly acknowledged.

For the third class of bills it is well to mail with the bill a coin holder for sending money through the mails, and a self-addressed envelope. By promptly issuing the bills this class of subscribers soon learns that a remittance is expected by return mail, and in nearly every case use the coin holder, sending the amount due at once without question. In case any part of the bill is unsatisfactory the matter may be immediately adjusted by telephone while it is still fresh in the subscriber's mind. Upon receipt of its remittance a receipt form on a postal card, acknowledging the amount and the date, can be used to very good advantage by the telephone company. This form of receipt effects a saving in postage and envelopes. The list of subscribers who use the coin holders can be made readily, and those who do not may either be educated to do so or be handled in a different manner, which is dependent upon the class to which the subscriber belongs and the amount of his toll bill. Promptness in mailing bills and receipts inspires a like promptness in the subscriber, and insures quick returns.

In the mind of the writer there has always been some doubt as to what percentage of a toll bill should be devoted to collection, as sometime it costs three or four cents to collect a ten-cent bill, or more than the local company earns from the toll message. But as the ten-cent bills are few, it has been his policy to spend what is necessary to collect them rather than let a subscriber get the idea that the toll bill can run along without any attempt at collection, as very often this would prove detrimental in case the bill for the following month was for a larger amount.

How to Prevent Through Ringing on Rural Lines.

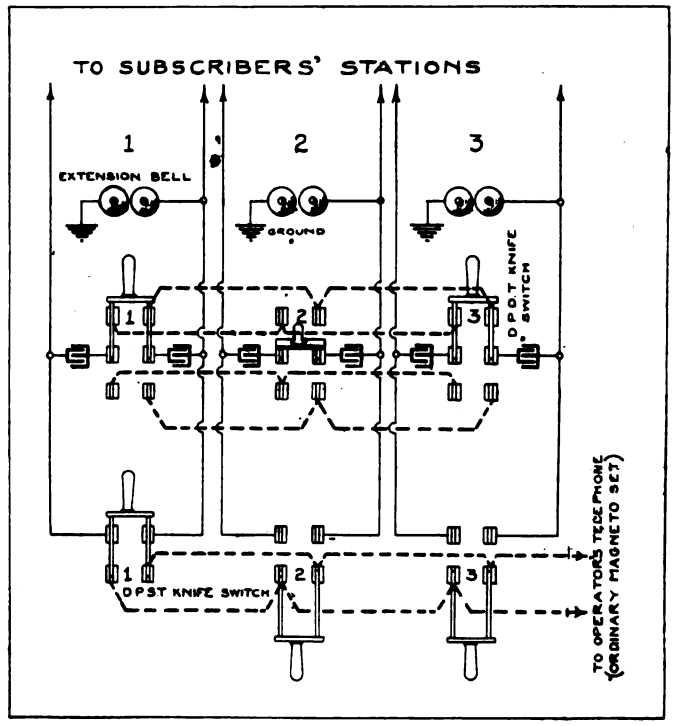
By Charles A. Wardner.

TROUBLE caused by a confusion of ringing signals going from one line of a connected pair through the switching devices at the central office and out on the second line; also by the lines so connected carrying in combination a load so heavy as to make it next to impossible to ring any one, is mentioned by a contributor to the discussion of "Rural Party Line Ringing Codes" in American Telephone Journal, issue of March 16. The writer of this article has had his patience tried by the same conditions and has at last hit upon a plan to remedy the trouble.

Knowing that a condenser placed in series with the receiver of a telephone prevented the ringing current from passing through the receiver, it seemed reasonable to suppose that a condenser placed in series with the wires of the switch connecting two lines would prevent the current from going out on the line temporarily connected. Makers of a certain commercial type of condensers were asked if they had a condenser which would answer for the purpose. They replied that a condenser could not be used in that way, that they were used only in telephones in series with the receiver. However, two of their condensers were actually purchased and wired in the switchboard as shown in the accompanying diagram.

The Trumbull knife switches are used in this switchboard and the condensers are wired in series with the centre or knife terminals of the switches to which are connected the incoming lines. Each line, however, comes down to the operator's single throw switch without any condenser in series, so the operator can ring out on any line, but the ringing current cannot pass from one line to the other when they are connected for talking. Although this arrangement interposes condensers in the path between the two talking subscribers, the talking current is not materially cut down owing to its frequency being higher than that of the ringing current. As may readily be understood, this action is precisely the same as that which takes place in the ordinary magneto instrument provided with a condenser wired in series with the receiver.

It will be noticed that the extension bell on each line is legged to ground instead of being bridged across the metallic circuit. In this way the operator is called without calling any of the parties on the line by pressing a grounding button on the subscriber's telephone when ringing the central office. Also, the operator at central does not hear the rings of one subscriber calling another on the same line, as each subscriber's bells are bridged across the metallic line.



Arrangement of Condensers to Prevent Through Ringing on Rural Line Switching Circuits.

This system has worked to perfection in one exchange and the idea may be of some benefit to others.

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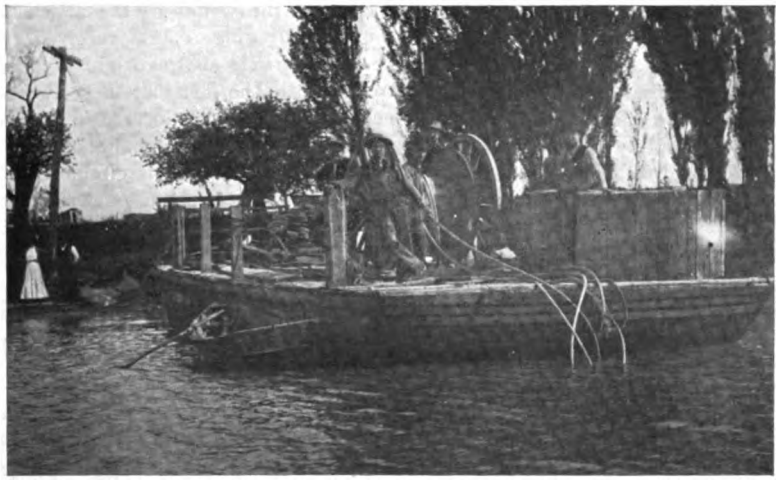
Laying a Submarine in Sandusky Bay

By J. K. Johnston, General Manager, Sandusky Telephone Company.

Paying Out Submarine Cable in the Middle of Sandusky Bay, Lake Erie.

TWO miles and a quarter of five pair standard submarine cable has just been cut into service to furnish direct short line connection between the exchange of the Sandusky Telephone Company and those of the Ottawa County Telephone Company in Ohio. The cable was laid from a lighter towed by a gasolene tug along a course marked at intervals by buoys anchored in the bay.

Three reels of cable were required to reach from shore to shore, and these were transported to Danbury, on the west shore of the bay. Here they were taken aboard the lighter, an ordinary boat of its class, thirty feet long by eighteen feet wide, rated to bear a burden of twenty-four tons. Arrangements for mounting the cable, which were of a very simple character, as shown in the lower illustration, were made, and it took only a short time to set up the first reel and get under way. The gasolene tug, with a sixty-horse power engine, was powerful enough to overcome the tendency to drift due to the wind, and with the aid of the buoys which had previously been anchored as guides it was not difficult to keep very nearly a direct course across the bay. For controlling the unreeling of the cable, in order to keep it from coming off at times more rapidly that the boat advanced, a brake was improvised from a lever of 2" x 6" timber twelve feet long, bearing on a wooden block set close to the reel to serve as a fulcrum. One man was kept in attendance at this brake, which answered its purpose admirably, the cable running out very smoothly, and, on account of its weight, anchoring itself in practically a straight line at the bottom of the lake. The landing was made at a point on the east shore, in Erie County, without any accident or unusual incident.



The End of the Trip—Landing on the East Shore.

Lines run through this cable greatly shorten the wire distance between Sandusky Telephone Company and the Ottawa County Telephone Company, which operates nine exchanges in Ottawa, Wood and Sandusky counties, under the direction of General Manager J. G. Steinkamp, of Elmore. The two companies arranged for placing the cable jointly. The actual work of laying it was directed by F. B. Livingstone, superintendent of the Sandusky Telephone Company, who completed the job in a single day.

Connections through the new cable give to the Sandusky Telephone Company a direct Toledo line and a direct Port Clinton line. The Ottawa County Telephone Company gets two direct Sandusky lines. This will give both companies much better toll service than heretofore, as prior to the laying of the submarine cable Sandusky subscribers talking to subscribers at Port Clinton and other points in Ottawa County, a distance of about eighteen miles, air line, were compelled to talk by the way of Milan, Norwalk, Fremont, Oak Harbor and Port Clinton, a distance running up to about sixty-five miles. Under the new arrangement there is not only a gain in efficiency due to the reduced mileage, but also arising from the cutting out of the several switching stations which were necessary in the old routing.

The telephone companies also have submarine cable from Catawba Island to Put-in-Bay, and from Marblehead to Kelly's Island. The new cable makes it possible to greatly improve the telephone service from Sandusky and Erie County to the islands. During the spring, summer and fall months there is a surprising amount of business transacted with the shore from the various points in the lake by fruit growers, fish houses and summer resorts. To these people, who for a long time have been accustomed to very slow methods of communication, the telephone has come to be a highly appreciated necessity.

SPECIAL MEETING OF OHIO INDEPENDENT TELEPHONE COMPANIES CALLED FOR AUGUST 6.

PRESIDENT FRANK L. BEAM of the Ohio Independent Telephone Association announces that at a meeting of the Executive Committee of the Association held at the Chittenden Hotel, Columbus, Ohio, Thursday, July 11th, the President was authorized to call a special meeting of all Independent telephone companies operating in the State, for Tuesday, August 6th. This will be a one-day session and matters of importance will come up for discussion at this meeting.

Reports of the meeting of the executive committee state that after the adjournment of the meeting it was officially announced that there would be no compromise with the Bell companies at any point, but that the fight would be carried on in every town.

It is said that one of the reasons for refusing to enter into any negotiations with the Bell people is the probability that the Valentine law could be invoked against any company which might sign a merger agreement.

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Notes by the Editor

WATCHING ADJUSTMENTS.

THERE is probably no class of apparatus used in connection with electrical circuits which it is more essential to keep working reliably than that used for receiving signals at the central office end of a telephone line. This statement derives its strength not from the advantages the telephone company derives from the perfect working of its appliances, important as this may be, but is rather based on considerations of the amount of absolutely necessary and urgent business which can be transacted properly only by telephone. Calls for doctors, hospitals, officers of the law, and for persons of many classes on urgent matters occur so frequently as to emphasize the prime importance of having facilities kept in the best possible condition for receiving the many such calls which come into telephone exchanges during every night and day. The successful handling of these calls depends upon the integrity of the line, and where apparatus liable to be in a condition of poor adjustment is present it constitutes, unless carefully watched, a point of liability to failure.

In every new exchange, for example, it is some time before the relays are brought to that state of permanent adjustment which insures their proper operation day after day, without any liability to trouble. Even after they have passed the trying-out period, an inexperienced troubleman may, through some error in judgment, adjust a relay which in fact needs no attention, or some other cause may intervene which will tend to prevent its successful operation. As a matter of fact, with conditions varying as they do on an ordinary telephone line, and with a certain amount of variation in the voltage of the central office batteries, dependent upon the state of charge, it is advisable to have line relays adjusted to operate through a very considerable range of resistance, otherwise an adjustment which may cause a relay to pull up easily enough when the weather is wet, for example, may result in failure when the insulation is high. The only way to avoid the possibility of such a trouble is to use standard high and low resistance limits for the operation of relays, and make periodical tests with sufficient frequency to give positive assurance of the condition of this important part of the plant.

On magneto switchboards common and approved practice has established an even more rigid standard than this in one particular—namely, the operation of the night bell. Probably there are few exchanges in the country where the night operator on a magneto board is not expected to make each night a test of drops, and see that his night bell is properly controlled by every circuit. This rule, however, is in all probability obeyed as infrequently as any which has ever been established for the guidance of telephone employees. There is no doubt, however, that although such a man may for a while be extremely fortunate in keeping out of trouble, the time will come when an emergency call will be made on a poor circuit, and the injury done to some person in such an event is likely to be sufficient to make the night operator wish most heartily that he had lived up fully to the letter of his rules.

LOCATION NO LIMIT ON ORIGINALITY.

MANY telephone men seem to think that because they are situated in small places their opportunities for advancement in knowledge, and ability to handle new situations are wholly dependent on the efficient performance of prescribed routine duties. Of course in large organizations, with rules governing every branch of the business, a man is doing very well indeed if he consistently lives up to all of the instructions laid upon him—in fact so well that the head of such a company would look upon a man who actually accomplished this result as little short of a marvelous creation. having no proper right to be in the telephone business. As a matter of fact, however, a man in a small or moderate sized exchange is not so nearly prevented from getting behind the rules, beyond the "what" and into the "why," as he thinks. There is usually a man in his own organization who is willing to help him, and he can always find somebody upon whose knowledge he can rely to carry him over his own weak places.

The alert and studious telephone man will not be prevented from finding out the reasons for most of the things he is called upon to do. But the man who goes ahead needs to go farther than this. He has perhaps in the first place a thorough knowledge of what may be termed a very fair collection of telephone principles. In order to make this knowledge profitable he must make some very keen inquiries into the working of things about him. Perhaps if he starts off with the idea that everything ought to be operating at exactly one hundred per cent. efficiency he will have a basis for thought that will be helpful. It is at once a standard by which things may be judged, and an ideal toward the attainment of which his efforts may be directed. With this standard set it is not very difficult in the average plant to observe departures; and, too, it is easy to tell just how far from the one hundred per cent. mark things are actually running. The rub does not come until one attempts to figure out a method of bringing them up to where they belong. This is where originality is required. It needs more than a knowledge of principles for this, and the man who accomplishes it must be able to shake up his principles, put them in new surroundings, and look at them from many sides at once. Those who are successful get a new application of some old idea that produces results. It may be something which contributes to the value of the service without increasing its cost, some method of bringing in new business, or any one of the thousands of little schemes which, in the aggregate, spell out the whole history of telephone progress.

In other pages of this issue of the JOURNAL are two articles which exemplify the sort of thing to which we have referred. One is a method which was devised to improve the efficiency of communication, and perhaps the most interesting thing about it, as an article, is the way in which the author briefly describes the manner in which this improvement suggested itself to him. There is another principal quality brought out which seems to be essential, and that is the one which indicates the persistency of his attack upon the problem in question, which was not dropped until the writer of the article had satisfied himself, in spite of discouraging reports received from outsiders.

The other article shows originality displayed upon altogether different lines. The fact that these two articles were contributed by men each of whom is located in a place of moderate size, and working with ordinary appliances and methods which are well known to persons in similar circumstances, should prove an inspiration to the many young telephone men who are disposed to complain of their lack of opportunities. They undoubtedly do have opportunities which come from the prevalence and nature of the very difficulties which they encounter and the lack of completeness of the facilities furnished them.

HOT WEATHER AND SERVICE COMPLAINTS.

SUMMER months in busy exchanges tax the operating department in numerous ways, but there is probably nothing more trying than the often observed increase in the number of complaints which seem to be unwarranted. Try as hard as she may, an operator is likely to let an indication of nervousness or fatigue appear in her voice, and if this comes after a delay the subscriber is more than likely to feel annoyed. In addition to this very trifling thing which sometimes leads the subscriber on to a general, but poorly defined feeling of dissatisfaction there is the matter of the wording of responses. There is no dodging the fact that departures from the standard phrases are recorded more frequently during tests made in summer than at any other time. Some of them are positively uncivil, too. The facts are clear enough, and they point to a condition that ought to be remedied. The experienced man, however, throws up his hands in despair, and says "But what are we going to do about it?" And what are we?

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From Judges and Juries

CONDUCTED BY A. H. McMILLAN.

LICENSE TAXES IN ALABAMA.

We recently received a notice from our tax commissioner, through our Judge of Probate, which reads as follows:

"State of Alabama, Revenue Department,
Office of Tax Commissioner of Washington Co.,
To Hon. John Smith, Judge of Probate, Lincoln Co.

I respectfully report to you that ——— Telephone Company of ———, Ala., is engaged in the business of operating telephones, for which a license is required by law, for which ——— Telephone Co. should pay an annual state tax of $5.00 and an annual county tax of $2.50. This tax appears to be due for the year 1907.

I respectfully request that you cite said party or parties to appear before you, and take out and pay for said license in compliance with the law in such cases provided.

Amount due

License as above	$7.50
Tax Commissioner	.75
Probate Judge	.50
	$8.75

Given under my hand and seal this, the 31st day of May, 1907.

CHARLES F. JONES,
Tax Commissioner of Lincoln Co.

Please advise us if they can compel us to pay the above amount. Our town is not incorporated, and we have no franchise of any kind. We have been thinking of getting a county franchise. Now, what advantage would a franchise be to us? Is a franchise what they are trying to compel us to take out?

We have a system of 70 telephones and the demand is growing. Everything seems prosperous in the business. An early reply will be appreciated.

M. T. C.

WE think that your company can be compelled to pay the above amount. It is not a tax for the granting of a franchise that the tax commissioner seems to be trying to compel you to pay, but his evident intention is to collect from you a privilege tax of $7.50. A privilege tax is just as valid as a property tax and may be imposed upon all persons or companies operating telephone lines, whether they are incorporated or have a franchise or not. We do not see what advantage it would be to your company, as it seems to be getting along nicely without it.

MUTUAL TELEPHONE COMPANIES AS COMMON CARRIERS.

Several farmers have formed a rural telephone company. A certain person of doubtful reputation applied to join the company, but the directors did not act on the application, as they understood that the sentiment of the people was against having him on the line. At the annual meeting of the company his application and another one were taken up and voted on. For his application five voted "Yes," seventeen "No," and three were blank. For the other one twenty-three "Yes," "No" none, and two blank.

If he buys a telephone and connects it up with our lines:

1. Have we a right to cut his wire? (a) Where it crosses the public highway? (b) Where it joins to our line?

2. If not, will the one who cuts it, or orders it cut, or both, be personally liable? (Our company is not incorporated.)

3. If I, the secretary, refuse to furnish him with a call after he has connected up, could he start an action against me, and would I be personally liable?

4. We connect with another company in town, paying a monthly rent for every telephone on our line for its service. If this company refuses to honor his calls, will it be liable to action (not having received the monthly rent)?

5. Would I be liable to action having (as secretary of our company) refused to accept monthly rent from him to pay to that company? S. L.

A MUTUAL telephone company, such as yours, does not occupy the same relations to the public as an incorporated company which holds itself out to furnish telephone service to every one who applies. Your company is simply a joint undertaking of a number of members to secure telephone service for themselves. They do not represent to the public that they are able or willing to furnish telephone service to every one who applies. They would, therefore, not be common carriers and hence would have the right to refuse to allow this person of doubtful reputation to become a member. Therefore, if this person's telephone is connected with your line, without permission, you would have the right to sever the connection. This could certainly be done at the point where his wire joins your line. You would not have a right to cut his wire at any other point.

2. As he would have no right to connect with your line, there would, of course, be no personal liability upon the person who cut his wire.

3. You would not be personally liable for refusing to answer his calls after he has, without right, connected with your company's line.

4. If your company allows him to remain in connection with your line, and the company with which you connect in town refuses to honor his calls, it would probably be liable. However, if in paying the monthly rental you stated to them that this person had no right to his connection, and had not paid the monthly rental, and that you were not paying rent for him, the company could safely refuse to honor his calls without liability.

5. You would not be liable for refusing to receive from him the monthly rent to pay over to the other company.

LAND OWNER'S RIGHT TO REMOVE WIRE.

We have some telephone wires passing over a 200 foot strip of land above any buildings, one pole on the land. Wires were put there without objection by owner, and have been there for two years. We could take out the pole on the land and let the wires swing clear over. Can he compel us to take the pole out? If we should remove the pole, can he compel us to remove the wires so they will not pass over his land? No pole is touching his land. J. D. J.

THE land owner has the right to have the pole that is set upon his land removed at any time. He received no consideration for permitting it to be placed there, and the fact that he made no objection and said nothing about it for two years, would not deprive him of his rights. The land is his and he can remove any persons or obstructions from it in the absence of any agreement on his part to the contrary. A land owner's property extends from the center of the earth to the heavens and he has just as much control over his property fifty feet from the surface of the earth as he has in the soil itself. He, therefore, could require you to remove a wire so that it would not pass over his land, even though there was no pole attached to the soil on his property.

DELIBERATELY PLACING ONESELF IN POSITION TO RECEIVE SHOCK BARS RECOVERY.

A VERY large judgment, amounting to $15,000, against the Citizens' Telephone Company and the Union Light, Heat and Power Company of Newport, Kentucky, has been reversed by the court of appeals of that state. The action was brought by Alice Westcott, administratrix of Edward Westcott, deceased, for damages caused by his death. At the time of the accident, he was in the employ of a railroad company as night gate operator, being on duty in a watch tower at the railroad crossing. In the tower was a "block signal telephone box" furnished by the Citizens' Telephone Company. The telephone wire had sagged until it rested upon an electric light wire in the neighborhood, and had, by this contact, become itself dangerously charged with electricity. As soon as the dangerous current reached the telephone box, it burned out the fuse, and manifested itself by a buzzing sound and emitting sparks. Westcott noticed the condition, saying that "the thing had a fit," and began a series of experiments with the telephone box. He touched the box at various times with his fingers, and with a wire, making the sparks fly. Then he placed his hand upon the box, and received a shock that killed him. Earlier in the evening two young men had told him that the wires were crossed. The court held that the deceased deliberately placed himself in position to receive the electric current, and accordingly could not recover, even though the dangerous condition was due to the defendant's negligence. Citizens' Telephone Co. vs. Westcott, Admx., 99 S. W., 1153.

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News of the Companies

ALABAMA CITY INVITES ENTRANCE OF INDEPENDENT TELEPHONE LINES.

BUSINESS and professional men of Athens, Ala., are determined to have competition in long distance telephone service. At the next meeting of the city council permission will be granted a rival company to enter the field in competition with the Cumberland Telephone and Telegraph Company for long distance business. Last year a franchise was refused the new company, which was compelled to go around the city with its lines.

PROVISIONS FOR THE COMFORT OF OPERATORS AT JOPLIN.

THE Home Telephone Company of Joplin, Missouri, has recently installed a kitchen service for the benefit of the operators and other female employees who work in the Joplin building. The company employs a matron who has charge of the operators' rooms, which consist of a lounging room, dining room, kitchen, bath room, and locker room. At lunch hours hot coffee and tea, cream, milk, sugar, crackers, and on rainy days and in bad weather, soup, are furnished to the employees. During the summer iced tea is furnished to those who desire it. Each girl brings from home whatever she desires in the way of lunch and the matron prepares the coffee, tea, etc., and serves it to the girls during the lunch hour. The articles enumerated above are all furnished by the company without any charge.

The kitchen is fitted with gas range, sink, kitchen table, ice box and pantry, together with all the necessary dishes and cooking utensils to be found in any home kitchen.

The company has sixty girls employed in the Joplin building as operators and office help and such of the girls as desire to take their lunch in the dining room may do so between the hours of 11 A. M. to 1 P. M. and 5 to 6 P. M. and at midnight for the all-night operators. Eight girls take lunch at a time, the operators' work being so arranged so that it gives all operators a chance to take lunch during these hours. The accompanying photograph shows a group of girls at lunch in the dining room, with the matron standing. The plans for providing operators with quarters which would add to their comfort when not at the board have produced very gratifying results.

Operators in the New Dining Room of the Joplin Home Telephone Company.

The Home Telephone Company operates in the famous lead and zinc mining district in Jasper county, Missouri. The Joplin exchange has over 2,500 subscribers and the company has other exchanges which bring the total to nearly 6,000 subscribers, besides a considerable mileage of copper toll line. Copper toll connections with the Kinloch Long Distance Telephone Company enable its subscribers to talk through to Cleveland and other eastern points reached by Independent long distance toll lines.

AMERICAN UNION TELEPHONE COMPANY ACQUIRES MORE IMPORTANT PROPERTIES IN PENNSYLVANIA.

THE Board of Directors of the American Union Telephone Company, with headquarters at Harrisburg, Pa., has approved the purchase of the Maryland, Pennsylvania and West Virginia Telephone and Telegraph Company, which is popularly known as the Tri-State Telephone Company. It has also approved the purchase of the Bedford County Telephone Company. These two properties add very materially to the number of telephones operated by the American Union Telephone Company and both occupy very important territorial positions.

The American Union Telephone Company is reported to be developing its property very rapidly and is already largely benefited by the consolidation of the various companies into the new system. The new companies just acquired will add very important links to the system, which now covers a very large portion of the State of Pennsylvania, as well as the northern portions of Maryland, West Virginia and Virginia.

Frank D. Houck, who heretofore held the position of general manager, was elected to the position of second vice-president. As second vice-president Mr. Houck will be relieved of a large amount of detail work heretofore devolving upon him and enable him to devote his time more largely to the executive work of the company. The reports submitted to the board of directors show a very marked increase in the number of telephones in operation and very satisfactory net earnings.

HOW THE PASTOR GOT HIS TELEPHONE.

LETTERS of inquiry about the small irregularities which are often unavoidable in conducting the affairs of a telephone company are seldom as quaintly worded as the one recently sent us by Mr. C. A. Pike, manager of the Interstate Telephone Company of Little Falls, N. Y. The following is an exact copy of the letter as he received it, under a heading bearing the name of the church of which the writer was pastor:

"Dear Sir:—The writer of this little epistle recently came to this little burg in the mountains and after some hard thinking how to make life bearable and possible with a little, little salary concluded to have a telephone put into the little flat which he now inhabits. Thereupon he gave his little message to the little operator, who was very kindly disposed to hear his request. And then he mustered his little patience and waited for the little telephone. It came not! A month passed and he hied himself again to the nice little operator. In the meantime a lady came from your Little Falls and put down black on white that Rev. Dr. —— wanted a telephone. The Doctor waited again. But the little 'phone came not. Now he writes to Little Falls and implores all the beautiful powers that be to put in this little 'phone!

"However, if it cannot be, of course it cannot be! Should this

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far talker not make its appearance soon the writer will have to depart his little patience and implore big resignation, by giving up all hope that he will ever possess such a thing—as long as he remains within the walls of blessed Dolgeville. Could you venture to give me your opinion, or try to guess when your men will have time enough on the line to put in this thing?

"Yours for everlasting patience."

For a cheerful letter of complaint it would be hard to beat this one!

LOUISIANA MAY COMPEL PUBLICATION OF LONG DISTANCE RATES IN TELEPHONE DIRECTORIES.

THE failure of the Cumberland Telephone and Telegraph Company to print its long distance tariff rates in late issues of its directory in New Orleans threatens to involve the company in a controversy with the Louisiana Railroad Commission. The company has been notified by the Railroad Commission that on July 24 the matter will be taken up. All telephone companies operating in the state will be required to show cause why the long distance rates applying to traffic in the state should not be printed. The matter was brought to the attention of the Commission through Mr. Allan Tupper, of New Orleans, who protested against the omission, and contended that the public and the patron of the company were entitled to this information. Mr. Tupper, after unsatisfactory correspondence with the New Orleans manager of the Cumberland company, referred the question to the Commission which has acted with promptness.

THE FIFTH CONVENTION OF THE VERMONT AND NEW HAMPSHIRE INDEPENDENT TELEPHONE ASSOCIATION.

TELEPHONE men from many of the strongest Independent companies in New England met at Bradford, Vermont, on July 9th. President H. W. Buchanan of Barton Landing, Vt., referred briefly, in his opening address, to the present rights of the Independent companies in railway stations. He said in part:

"At the last session of the Legislature in Vermont an act giving equal rights to telephone companies having 500 or more subscribers, in railroad stations in the state was passed. The Vermont People's Telephone Company of Orleans county immediately applied to the Boston & Maine Railroad Company for privilege to install at Barton Landing and Newport instruments, as provided by this law. This request was refused. Complaint was filed and case heard at May term of county court at Newport, at which were present W. B. C. Stickney, attorney for the New England Telephone & Telegraph Company, and Young & Young for the railroad company; Clark C. Fitts, attorney-general, and E. S. Cook, state's attorney for Orleans county, for the state. Case sustained by court and appealed by defendant to supreme court.

"The effect of this law, declared constitutional, will be far-reaching."

A proposition was submitted by F. C. Gleason of Warren, N. H., that the Independent companies combine for the construction of trunk lines and this was greeted with hearty approbation.

George W. Buzzell, secretary of the association and manager of the Citizens' Telephone Company of St. Johnsbury, read a paper on the growth of the Independent movement last year.

A strong address was made by J. B. Peckett of Bradford on the need of looking after Independent interests in the Legislatures of Vermont and New Hampshire. Speeches were also made by Dr. O. D. Eastman, of Woodsville, N. H.; F. H. Whitman, of Boston; George B. Shaw, of Exeter, and W. E. Kinsman, of Heath, Mass.

Dinner was served in the evening on the veranda of the hotel. Dr. O. D. Eastman was toastmaster.

At the opening of the second day's session a committee was appointed to consider plans for organizing a company to build toll lines. This committee, of which the members are H. W. Buchanan, G. W. Buzzell, J. B. Hay, D. L. McGuire and F. C. Redfield, will report at the next meeting.

HOROSCOPES BY TELEPHONE!

A PROFESSOR at Ohio State University, Columbus, when called to the telephone, heard a woman's voice saying: "Hello, Professor! Hello!"

"Hello," he answered briefly. "What's wanted?"

"Is this Professor L———?" came the anxious, tremulous tones.

"It is, Madame. At your service."

"Well, say, Professor," came the voice again, "I have so wanted to ask your advice. You are the star professor, aren't you?"

"Well, yes, perhaps," answered the puzzled professor. "I do a little in that line."

This will be appreciated when we state that the professor has a reputation all over the world as a first-class astronomer.

"Well," said the voice, "I just wanted to wean baby, and I wanted so much to ask you if the stars are right."

"Well—yes—I guess—I think they're all right."

"Oh, do you? I am so glad! I will wean him this very night. Charge to Mr. ———," naming a well-known business man.

The professor hung up the receiver by the wrong end, scratched his head, blushed, then looked at the telephone, smiled, grinned, then guffawed and then went back to his calculation of the parallax of Castor and Pollux, the twins.

LOW NIGHT RATES TO BE ABOLISHED BY CUMBERLAND (BELL) COMPANY.

THE night rate will be abolished over the entire system of the Cumberland Telephone and Telegraph Company. Preliminary to putting this order into effect application has been made to Judge Niles of the Mississippi jurisdiction of the Federal court for an injunction restraining the Railroad Commission from interfering with the company's plans. The injunction will be heard on its merits at the September term of the Federal court at Jackson.

Officials of the company have held several conferences with the commissions of Mississippi and Tennessee, and these bodies have intimated that they would resist any efforts to disturb the present rates. The litigation is instituted to determine the authority of the Railroad Commissions, and the issue will be watched with interest by telephone people throughout the country. With respect to the abolition of the night concessions General Manager Leland Hume says: "The idea in granting the special night rates originally was to compete with the telegraph companies. They accept messages to be delivered at their option on the following day. As a matter of fact, unlike the patrons of the telephone, they are not in direct communication with their correspondents. The telephone companies put their patrons in direct touch with correspondents, and they must give this service when it is demanded, whether night or day. There is no economy in maintaining these night rates. On the contrary, the services of operators for night hours is more expensive, and night offices must be maintained at many remote points because of the congestion of the lines. We have found that hundreds of business men delay their messages until night to secure advantage of the concession. As a consequence the company's offices are crowded each night and traffic is congested, while the revenues are cut in half and expenses increased. I do not believe in the light of these facts that railroad commissions, even if they are disposed to do so, will be allowed to interfere with the company's plans to maintain uniform rates for day and night service."

Business men in Nashville, Memphis, New Orleans, Louisville and many other cities have entered a protest against the change in the rates and state that they will use the lines as little as possible, giving the telegraph companies the majority of their business if the advance is made.

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Answers from Experience

BAD GROUND ON C. B. INSTRUMENT.—(888.)

We installed a telephone on a hill in a coal office. The Bell Co. also had a telephone in the same building. Both the Bell and our company's central ring their subscribers grounded.

After we had installed our telephone, every time the Bell central would ring up this coal office our instrument would ring. Both companies used separate ground rods some five feet apart. We might also say the Bell

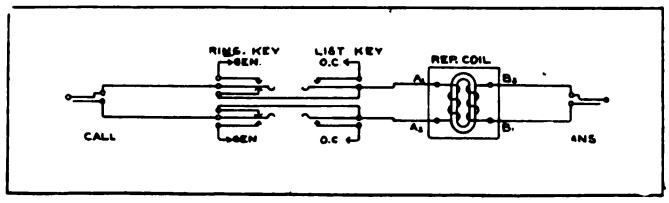

Fig. 889a.

company has difficulty in getting its instrument to ring distinctly, although it has driven a six foot ground rod. We cannot make our telephone ring as distinctly as we would like. Kindly advise us through your paper what causes this trouble. F. I. C.

From the data given in your query we would say that you have a case of high resistance ground. The hill upon which your instrument is installed may be either rocky or sandy. For example, we will assume the resistance of your ground connection to be 1-10 as great as the resistance of the Bell line, then the Bell line will receive 1-11 of your ringing current. You undoubtedly understand that electrical currents will divide themselves proportionately between all conductors and do not take the path of the least resistance as is occasionally supposed.

We would advise you to bring your ground back along the line until you are able to secure a good earth connection. If this distance is too great so as to cause it to be either undesirable or expensive, we would then suggest that you drive an unusually long ground rod which will tend to overcome the trouble that you experience.

REPEATING COIL CONNECTIONS.—(889.)

Is there a right and a wrong way of connecting repeating coils in on a line? I am using a W. E. Co. No. 8A on a line twelve miles long of No. 12 galvanized iron wire. R. A. F.

As you do not mention the kind of key circuits you are using or wish to use, nor the kind of line and for what purpose, we are unable to advise you definitely as to your question. We will, however, show several ways in which repeating coils may be connected and trust that one of these will apply to your case. If these methods do not apply, kindly give us further detailed information and we will be pleased to advise specifically.

Fig. 889a shows a combination listening and ringing key. The A side of the coil is connected to the key and the B side to the answering cord as shown. Fig. 889b shows another ringing key arranged to ring divided. In this circuit the generator is grounded and the telephones are connected on one side of the line to ground, which allows either of the two sides to be selected. The repeating coil is connected in the same manner as shown in Fig. 889a, bringing the *A* side of the coil to the listening key and the *B* side to the answering cord. Fig

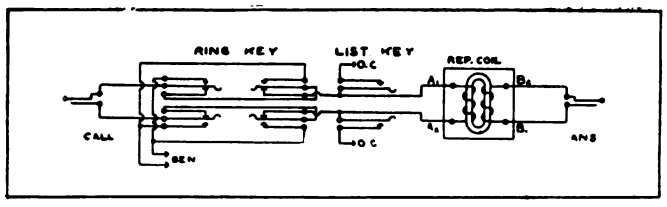

Fig. 889b.

889c shows the method of wiring a double ringing key to the repeating coil. The ringing key is wired to ring either on the answering or calling cords, the *A* side of the repeating coil being connected to the contact springs on the calling side of the ringing key and the *B* side connected to the same as on the answering side.

Fig. 889d shows a repeating coil key. This is a very convenient circuit but rather more difficult to wire. This arrangement allows the operator to cut the repeating coil in or out of circuit at will. The cords may then be used between two local lines, between a grounded and a metallic line, between two metallic lines, or between a good line and a bad line. The key is of the make and break type and remains in either position. When the key is at normal, the circuit will be as follows: From the tip of the calling cord to spring No. *1* and then to No. *2* to *3* to *4* to *5* and to *6*, from which it goes to the tip side of the answering cord. The sleeves of the calling plug goes to spring No. *7* to *8* to *9* to *10* to *11* and to *12*, from which it goes to the sleeve of the answering plug. When the repeating coil is thrown from this normal position, we have a circuit from the tip of the calling cord key spring No. *1*, *2*, *3*, and to *13*, to repeating coil A^1 through the repeating coil to A^2, then to spring

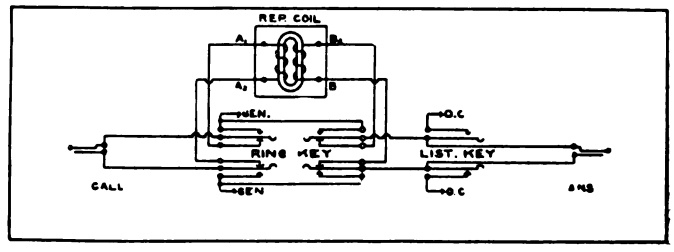

Fig. 889c.

No. *8*, No. *7* and to the sleeve of the calling plug. Also from the tip of the answering plug to spring No. *6* to No. *5* to repeating coil B^2, through the coil at B^1 to spring No. *14*, to *10* to *11* and then to *12*, from which it goes to the sleeve of the answering plug.

If you are using a clearing out drop it should be bridged across winding *B* of the repeating coil.

EFFICIENCY OF DRY BATTERY.—(890.)

Please inform me through the columns of your journal what advantages—if any—are to be gained by using in series with the primary of a series induction coil and a transmitter offering a normal resistance of from fifty to sixty ohms, a dry cell capable of delivering fifteen amperes on short circuit over one capable of delivering only one ampere on short circuit. T. P.

So far as the quantity of the output of a dry cell is concerned

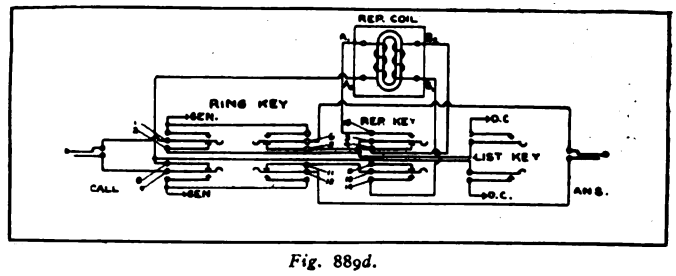

Fig. 889d.

there is no difference. Just so long as the dry cell is capable of giving out the current necessary to operate the transmitter it is all right, providing, of course, that there is no other difference between cells. The difference is that the cell of low output is of higher internal resistance than the cell with the large output.

The amperage to be obtained on short circuit means nothing excepting that it is used as a basis for calculating the internal resistance of the cell.

In determining the ampere hours of a dry cell, we have an entirely different proposition. This test should be made through a low resistance which should be allowed to remain in circuit for a time and then taken out of circuit for a time in order that the cell may have opportunity to recuperate, then repeating the operation. The best manner in which to make this test is by means of a clock so arranged as to open and close the circuit at stated intervals.

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A SUCCESSFUL, progressive Telephone Manager having full charge of six exchanges wishes to make a change within sixty days. In replying state salary and territory. Address, Box 853, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 853

COMPETENT man wishes position as telephone auditor or accountant, capable of going ahead with office detail or installing system, latest ideas, best of references. Address, Box 856, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 856

POSITION WANTED—Young man, 24, three years' experience in installation of P. B. X. switchboard, intercommunicating systems and interested in the trade; salary $21. Address Box 870, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 870

WANTED---Continued

WANTED—Position with telephone company as maintenance or instrument man. Five years' experience. Best of reference. Address Box 867, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 867

WANTED—Position by telephone engineer, capable of taking charge of plant, giving good service to subscribers and dividends to stockholders. Best of references as to ability as electrician. Four years last position. Address, E. J. Pitrat, 210 S. Grove street, Urbana, Ill. 872

WANTED—Position as manager or superintendent by first-class all around magneto, common battery and construction man; 12 years' experience. Married; best recommendations. If don't make good, want no salary. Address M., 4620 Easton Ave., St. Louis, Mo. 873

WANTED—Position as manager, contract agent or high class solicitor in the independent field by a thoroughly competent telephone man with twelve years' practical experience. Familiar with magneto and common battery systems. Now holding position as manager of three exchanges for an extensive independent concern. In present position two years. Salary to start $100 per month. Address, Box 874, care AMERICAN TELEPHONE JOURNAL, 100 William Street, New York. 874

BIDS WANTED.

THE National Telephone Company, of 97 St. Peter street, Quebec, Canada, announces it has plans and specifications completed for a 3,000 line central energy telephone exchange in the city of Quebec, Canada. Bids will be received from August 1st to August 15th inclusive, and contract will be let September 1st next.

All who desire to bid can get a copy of specifications and plans by addressing National Telephone Company, 97 St. Peter street, Quebec, Canada, and making formal application for same. 875

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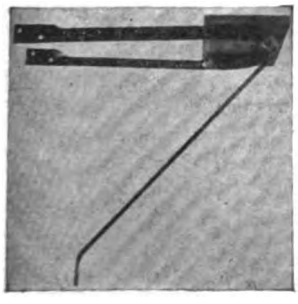

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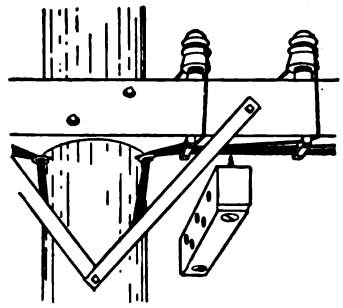

SECURITY SPIDER WIRE CLEATS

Cost but a trifle, but you'll be surprised at the improvement they'll make in your line construction work.

'Twill pay you to get our Bulletin Number Three—it gives further facts and figures.

THE F. BISSELL COMPANY TOLEDO, O.

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Inventors and Inventions

SUBMARINE SIGNALING APPARATUS.

L. I. Blake, Boston, Mass., patents 852,647, 852,648 and 852,760, May 7, 1907, and assigns to Submarine Signal Co., Boston.

These patents describe the theory, art and a receiver of systems of submarine signaling, respectively, in which the fundamental idea is the propagation in the water of sound vibrations, and their reception by submerged instruments sensitive to such vibrations.

COMBINED TELEPHONE AND TELEGRAPH INSTRUMENT.

F. W. Medhurst, Hobart, Tasmania, Australia, patent 858,739, July 2, 1907.

The device described in this patent comprises a combination telephone and telegraph instrument mounted together in a compact carrying case, and is designed primarily for military service. The induction coil in the telephone circuit is supplied with three windings, and is so arranged as to be used as a signaling medium in place of the customary ringing mechanism, the balance of the apparatus being of the customary type.

SELECTIVE LOCK-OUT SYSTEM.

C. A. Anderson, Lindsborg, Kas., patent 858,363, July 2, 1907.

This patent relates to step by step selective lock-out party line telephone systems, in which the apparatus consists of three relays, a hand generator, a step by step mechanism and an engaging pawl.

In this system the indicator is set to the point desired, and the actuation of the selective mechanism is accomplished by the turning of the hand generator, which causes the mechanism to move forward to a predetermined point, at which time the energy of the generator ceases to actuate the selective device, and the current rings the bell of the desired subscriber.

ANCHOR.

C. E. Frost, Cleveland, patent 855,298, May 28, 1907.

The anchor described in this patent is formed of a piece of metal substantially T-shaped in cross section, and having inserted in the rib a loop and rod, by means of which it is inserted in the earth. The point of the anchor is beveled, and the rear end is bent outwardly, so that it may engage with the earth. By pulling, the entire anchor body is brought into position at right angles to the holding rod, to which is attached the guy strand of the device to be supported.

SELECTIVE RINGING SYSTEM.

J. M. Storkerson, La Crosse, Wis., patent 858,767, July 2, 1907.

The ringing system described in this patent comprehends the possibility of eight subscribers' stations on one line and the selective ringing of each.

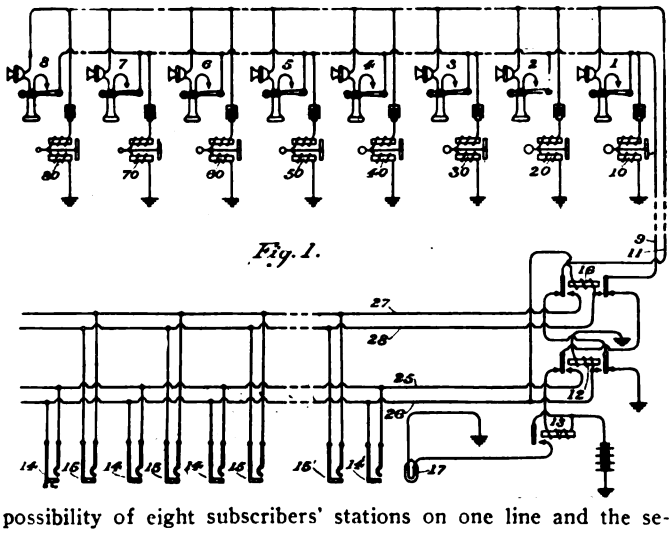

Fig. 1.

As shown in Fig. 1, the ringers 10, 30, 50 and 70 are connected from one side of the line to the ground, while ringers 20, 40, 60 and 80 are connected from the opposite side of the line to the ground. The source of ringing current is a generator having current of four different frequencies. The ringers being tuned to respond to these frequencies by means of various sized tappers.

By the arrangement of the jacks 14, 15 in the central office the subscribers' stations on the line are divided into two groups, so that the operator uses but the customary four selective ringing keys on her cord circuit, the subscribers signaled, depending on the jack in which the calling plug is inserted and the key depressed.

The inventor states that this system is applicable equally as well in systems of the three wire type.

ANCHOR.

F. R. Parker, Chicago, patent 857,751, June 25, 1907; assigned to F. B. Cook.

The device described in this patent comprises a number of spiral auger blades 3, a cutting portion 2, a number of toothed extension blades 5, and a cogged wheel 9, mounted together on a rod 6 in such a manner that when the rod 6 is twisted in one direction the spiral shaped auger blades will bore the anchor into the earth; while twisting the rod in the other direction will unlock it from the spiral blades and will cause the blades 5 to extend outwardly.

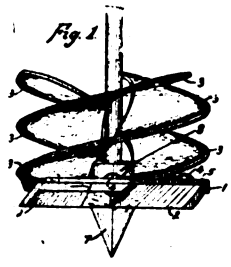

Fig 1

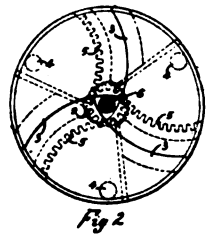

Fig 2

The inventor's object being to provide an anchor that may be inserted into the earth without the necessity of digging a hole for its reception, and one which will present a larger holding surface than that offered by the auger blades alone.

AUTOMATIC TELEPHONE SWITCH.

C. M. Thompson, Chicago, patent 857,966, June 25, 1907, assigned to C. M. Thompson Co.

This invention relates to improvements in automatic telephone switches, the object being the elimination of sparking at the relay contacts of the local circuit due to the self-induction of the motor magnets. The construction adopted for the accomplishing of this feature is the provision of each motor magnet with two coils of the same size or magnetizing power and so connecting the coils to the relay magnet that the current is first passed through one coil to energize the motor magnet and then passed through the other coil in the opposite direction to neutralize the first coil, thereby de-energizing the magnet. This de-energizing usually being accomplished by discontinuing the current through its circuit, which causes a spark at the opening of the circuit.

The principal feature claimed for this improvement by the inventor is that it obviates the necessity of using platinum or other expensive non-corrosive material for contacts.

TRUNKING SYSTEM.

W. W. Dean, patent 851,803, April 30, 1907, assigned to K. S. & S. Co., Chicago.

This patent relates to modifications in application No. 113,581, filed June 28, 1902, whereby the trunk relay remains actuated during the continuance of a conversation, thus simplifying the construction of the apparatus and the circuits. It further includes a trunk relay that is under the control of the A operator.

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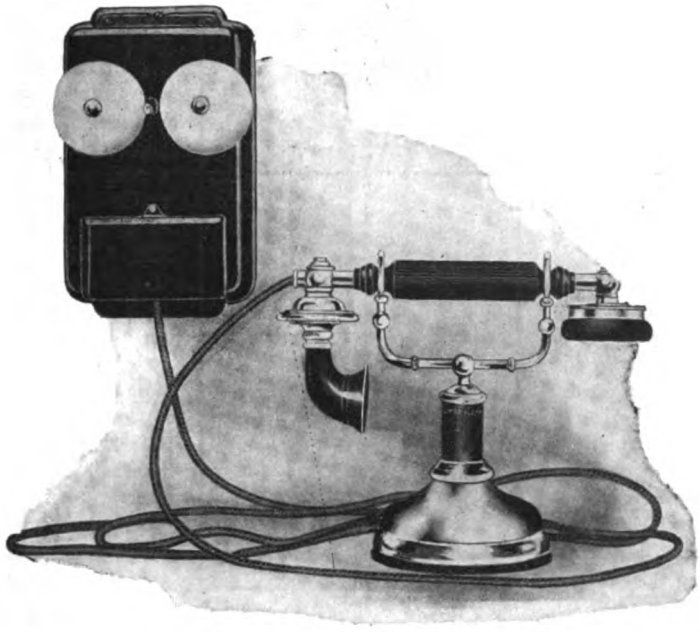

Ericsson Common Battery Desk Set

HANDMICRO TELEPHONE TYPE

An examination of the apparatus will verify the world-known attention to details in all L.M. Ericsson instruments.

The all steel extension bell box is first copper-plated, then given three coats of highest grade baking enamel, which makes it absolutely rust-proof.

The ringer is the Ericsson two magnet type, adjustable by one screw, and obviously more efficient and sensitive than the one magnet type.

The condenser will not get punctured by every little discharge, the capacity being obtained by a sufficient quantity of tinfoil and not by pressure.

The induction coil must necessarily be efficient, the space between windings and the core being reduced to a minimum by using a soft iron tube instead of paper or wood.

The spring group is adjustable without bending the springs. Only one contact used for C.B. system, decreasing the chance for trouble to the least possible degree.

By the interchangeable base plates the instrument is convertible from L.B. to C.B. and vice versa.

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The Progress of Manufacture

THE STROMBERG-CARLSON COMBINATION TELEPHONE.

CONTACT springs of the circuit controlling switch and the plunger which actuates the springs, forming an arrangement corresponding to the ordinary hook-switch, are placed in the handle of the Stromberg-Carlson combination telephone, and operated by the movement of the receiver. They are so designed and arranged that they may be so placed without enlarging the size of the telephone. No triplet or hook-switch box is required, thereby providing a most convenient and compact telephone that can be placed anywhere and yet be ready for use.

The illustration of the instrument hanging on a dummy hook shows the receiver in its normal position, but when placed to the ear it takes the position shown in dotted lines in Fig. 2. The operation of placing the instrument to the ear signals the operator, and removing the receiver from the ear opens the contacts and gives the disconnect signal in the regular way. The movement of the parts can be traced from the sectional view, Fig. 2. The lever *C* is rigidly fastened from the inside of the back plate *A* and moves on the fulcrum pin *D* which is driven through the socket *B*, the casing containing all the lever parts. When the receiver is tilted upwards by pressure against the ear, the foremost end of the lever *C* in which is fastened the link *E* is forced down, actuating the plunger rod *F*. This forces the rubber plunger *G* down, letting the operating contact springs *H* snap over the plunger and bringing them together. As the telephone is taken from the ear the receiver is aided to drop to its normal position by the music wire helix which draws the plunger up and opens the contacts as shown.

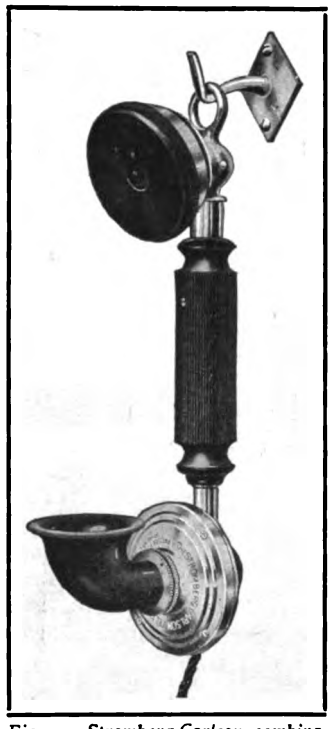

Fig. 1. Stromberg-Carlson combination telephone.

If one wishes to hold the line he can do so by placing his thumb against the receiver, or give a signal for a new connection by moving the receiver backward and forward.

This combination telephone, known as the No. 5, is furnished with a cord having no external braiding, a new style, and metal extension bell.

The Stromberg-Carlson Tel. Mfg. Company, of Rochester, N. Y., has furnished these instruments for a variety of purposes, mostly for bank people and busy men who wanted something unique but not cumbersome. It has met with favor among business men on account of its lightness, its neat appearance, and the ease with which it may be handled, or kept ready for use on a desk.

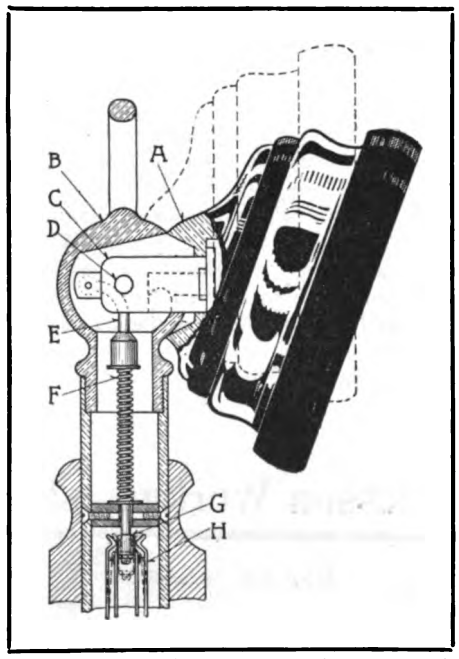

Fig. 2. Details of receiver mounting and circuit controlling switch.

THE ELECTRIC CABLE CO., of New York, has just bought the entire business of the Eastern Wire and Cable Co., of Roxbury, Mass. The latter company is one of the oldest and largest manufacturers of rubber covered wires and cables in New England. Its entire equipment will be removed to Bridgeport, Conn., where it will be installed in the plant of the Electric Cable Company, which has in course of construction a large addition to its plant, which will make this one of the largest wire and cable plants in the country. The officers of the Electric Cable Company are: President, Edwin W. Moore; vice-president, F. H. Cowles; treasurer, J. Nelson Shreve.

THE CENTRAL TELEPHONE & ELECTRIC COMPANY, St. Louis, Mo., is mailing bulletin No. 28, illustrating a very complete line of inside and outside apparatus for protecting telephone circuits from lightning and other discharges. The bulletin not only shows pictures and descriptions, but net prices. The company is glad to mail this bulletin, and others in its series, to interested persons on receipt of a request.

THE F. BISSELL COMPANY, Toledo, O., reports that its business has increased to such an extent as to warrant the establishment of a traffic department to improve its service to its customers. This has been placed in charge of Mr. A. G. H. Jenssen, formerly connected with the Wabash General Freight Offices, who will look out for securing the best possible facilities on all shipments. The purpose of this work is to give customers the advantage of the lowest possible rates, not only on pole and other large carload shipments, but even on small orders. His work is designed to insure prompt deliveries, and immediate tracings in case of failure to receive material when expected; in fact, to do everything possible to get the material into their hands without delay or avoidable expense.

E. S. MOORER, formerly vice-president and general manager of the Piedmont Electric Company, Anderson, S. C., has recently resigned to devote his entire attention to telephone engineering and construction. He is prepared to furnish reports, appraisals and estimates and plans for new plants or the reconstruction of old plants. He will continue to maintain his headquarters at Anderson, S. C.

THE DEAN TOLL BOARD FOR DETROIT.

DEAN Electric Company, Elyria, Ohio, is now constructing a large toll board for the Home Telephone Company of Detroit, Mich. This board is of the full common battery lamp signal multiple type, and the equipment includes nine two position toll sections, one two position chief operator's desk, four supervisor's sets, a messenger call system, a toll and Morse test board, an eight set repeater table, a composite cabinet, relay rack, intermediate distributing frame and a high current arrester frame. A complete power plant is also furnished, including duplicate charging machines, special Morse battery, power board and fuse panel.

The system is to be arranged for an ultimate capacity of 200 regular toll lines, and 100 special toll lines for local subscribers who are heavy toll users. The 100 recording trunks and 100 service trunks are divided between the main office and three branch offices of the Detroit system, which are also being installed by the Dean company, who state that every effort is being made to assure the people of Detroit a perfect service.

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EXCHANGE MANAGER: Success is due to co-operation.

How is this best obtained?

Make every subscriber a co-worker.

Yes, this is possible and not difficult either.

Then your list of subscribers will grow.

Also, and this is important, the number of extension telephones will increase rapidly, bringing additional revenue.

Help comes to those that help themselves.

Let the people have service when, where and as they want it.

We help by creating direct the demand for this service.

You help by giving it promptly.

No, the service cannot be as perfect with other apparatus.

Yes, we will tell you why. Write.

Watch This Space

The
Wire & Telephone Company of America
ROME, N. Y.

Horizontal Telephone Cable Splices

HAVE MANY DISADVANTAGES.

First—You have two masses of solder on each end of the sleeve that have to be carefully wiped, which necessitate the employment of a high priced expert cable splicer. Second—Your horizontal wiped joint may not be absolutely moisture proof. Third—When it is necessary to open a joint the solder has to be blown off of both ends and the sleeve moved back or cut. Fourth—It is difficult to get at the inside pairs. Fifth—The sleeve must be moved over the spliced pairs and both ends carefully soldered and wiped when a test or repair is finished. Sixth—It does not admit of changing of multiples without removing the sleeve and solder. Seventh—It takes at least two feet more room in a manhole in underground cable construction. Eighth—It costs more on first installation.

No. 1.

No. 2.

No. 3.

No. 4.

No. 5.

No. 6.

Compare the above with the ease and economy with which a joint can be made when you use

HARGIS CABLE SPLICING JOINTS

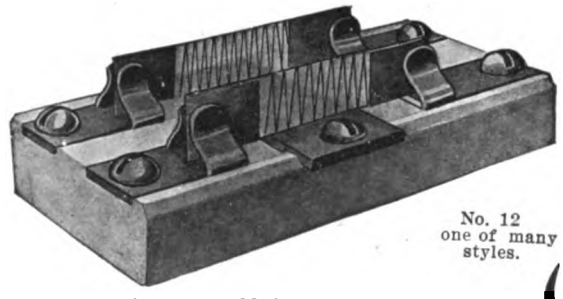
By referring to the six pictures and the following descriptive matter you will get a good idea of its advantages over the old style horizontal wiped joint. No. 1—Showing method of putting cable through lead gasket and brass collar before soldering. Note the cut thus formed. No. 2—The solder at a little above wiping heat is then poured into the cup and any roughness removed by a blow torch and wiping cloth. No. 3—The armor is then taken off the cable and the wires boiled out with paraffine. No. 4—The wires are then spliced as usual, only with greater ease. No. 5—Shows the appearance of the H. S. J. when the pairs are laced ready to be enclosed by the lead casing. No. 6—The joint is completed by screwing the sleeve tight with the spanner wrenches.

Made in three sizes. Costs less on first installation. Saves money while in use. Send in your order to-day.

W. N. MATTHEWS & BROTHER, Manufacturers of Patented Money-Saving Specialties
214 N. Second St., St. Louis Branches: New York, San Francisco.

You Will Be Too Late

If you wait until the lightning has done its damage and then place better protection.


No. 12
one of many styles.

New Bulletin 28—Just Out

Shows the most complete line of inside and outside protection ever offered. We make only High Grade Apparatus. Our Bulletin shows net prices. Write to-day.

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Makers of High-Grade Telephone Apparatus. Dealers in Telephone Supplies (Exclusively)

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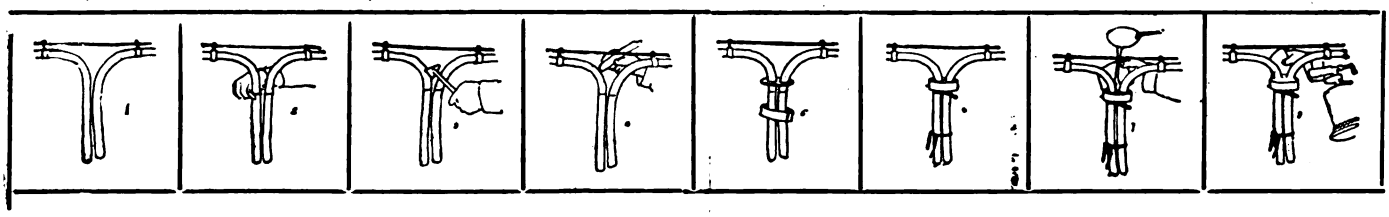


Among the interesting features of this board is a lamp busy signal associated with each multiple jack and also with each answering jack. A button key is also associated with each answering jack to switch all lines to a common section for night work. Each cord circuit is provided with double lamp supervision, keys for ringing or listening on either cord, and special keys for listening in with or without battery. All toll lines are carried through the test board and arranged for Morse and composite work.

THE MOISTURE-PROOF QUALITIES OF A HARGIS SPLICE.

MR. KEMPSTER B. MILLER, the well known telephone engineer, has tested a one hundred pair cable splice made with the Hargis splicing joint to ascertain its moisture resisting properties.

This splice between two one hundred pair cables was made in Mr. Miller's presence, and he afterward made the test, obtaining results which he embodied in the following report:

"The cables were lead covered, having 22 gauge conductors with a single paper wrapping. The wire joints in the splice were covered with ordinary paper sleeves and the splice was afterward boiled out in paraffin in the ordinary manner.

"Twenty-four hours after making the splice, the lead sheath on each cable was cut back for a few inches to expose the conductors for test. The insulation resistance of the various wires was then measured, each wire being measured against all the others and the sheath. The average resistance of each wire with respect to all the others in the sheath was approximately 20,000 megohms. The joint was then completely immersed in water, the water extending up on the cables several inches above the splice. In order that the cable conductors protruding from each end of the lead sheath might not have their insulation altered by the possible presence of water vapor, each end was carefully protected by soft sheet rubber, completely enclosing the ends and bound tightly against the sheath.

"After submersion in this manner for four days, the insulation resistance was again measured and found to have changed in no substantial degree. Some differences were noted in the measurements, but in each of these cases the insulation resistance was somwhat higher than that previously noted.

"The joint was again put to soak for two days more, making a total of six days, after which insulation measurements were again made, the readings being substantially the same as before.

"The splice was then opened by unscrewing the protecting lead sleeve or hood and no traces whatever of moisture could be found within it. In order to prove that the presence of moisture within the sleeve would affect the insulation resistance even though it did not touch the conductors or their insulation, a very small amount of water was placed within the sleeve which was again screwed in place and held in such position that the water could not come in contact with the conductors or their insulation. After standing in this position for twelve hours, the insulation resistance of the various wires was measured and was found to have decreased to about one-tenth of its former value.

"The single wiped joint through which the cables enter the splice is, I believe, of such a nature as to be less subject to faults than are the two wiped joints in a splice constructed by the method now in vogue. The wiped joint in the Hargis splice is virtually a poured joint, the making of which would seem to be within the skill of an intelligent workman after a little practice. I believe that the danger of moisture leaking through the wiped joint on the Hargis splice is less than that of its leaking through the two wiped joints of the ordinary splice.

"I have given careful thought to the matter of the moisture resisting properties of the rubber gasket upon which the screw-threaded part of the protecting hood or sleeve seats when screwed into place. As this gasket is practically protected from light, air and moisture, I believe that the life of the rubber would be retained for many years. Its renewal, if it were found to deteriorate after a period of years, could be made at slight expense. As this gasket occupies a space between two turned brass surfaces, there seems to be no question as to the reliability of this portion of the joint, if care is taken to properly seat the gasket.

"From these tests, together with a careful study of this cable splice from all points of view, I conclude that the Hargis joint if made with a reasonable amount of care, is water tight and may be counted upon as remaining so throughout long periods of time."

The small illustrations shown in connection with this article show the various steps in making a Hargis splice for straight-away work. The manufacturers state that it can also be used to great advantage for branch splices. Any further information desired can be obtained by writing to W. N. Matthews & Bro., 214 North Second street, St. Louis, Mo.

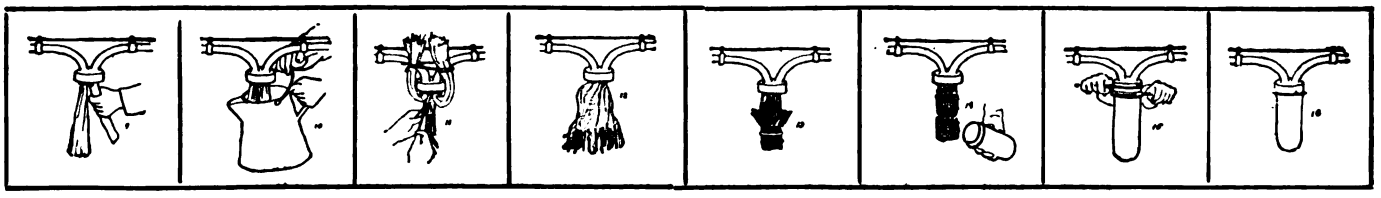
ANDERSON FORGE AND MACHINE COMPANY, Detroit, Michigan, is placing on the market an improved pole raising wagon by the use of which, it claims, a large saving is effected in the cost of pole setting.

An extra heavy drop platform truck constitutes the wagon. Upon this at the rear end is placed a trunnion for the support of a steel tubing boom by means of which the poles are raised. A hardwood spar is also provided as an extension for use where poles of an extraordinary length are to be set.

The front end of the wagon is equipped with a hoisting winch which operates the guy lines supporting the boom so that the position of the pole which is being raised may be readily controlled.

The raising of the pole is accomplished by means of the team which hauls the wagon, pulling suitable tackle through a snatch block.

The wagon has a full complement of guy lines, snatch blocks, tackle, tool box and has a rack to support miscellaneous tools, etc.



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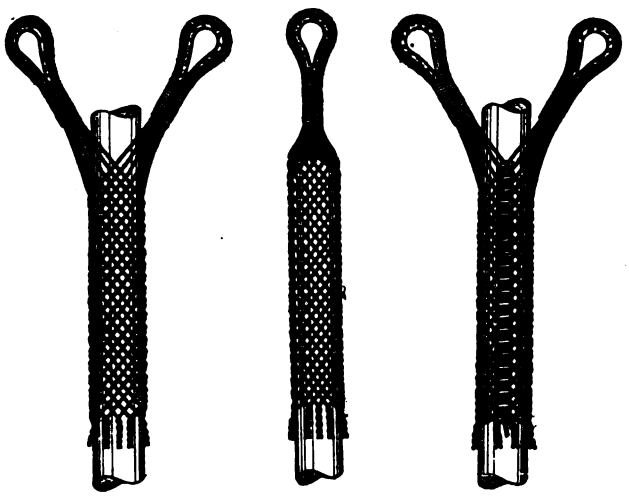
your cable sheathing, no time lost by your men, no expensive "let go" when you use the

Universal Cable Grips



DOUBLE EYE. SINGLE EYE. SPLIT GRIP.

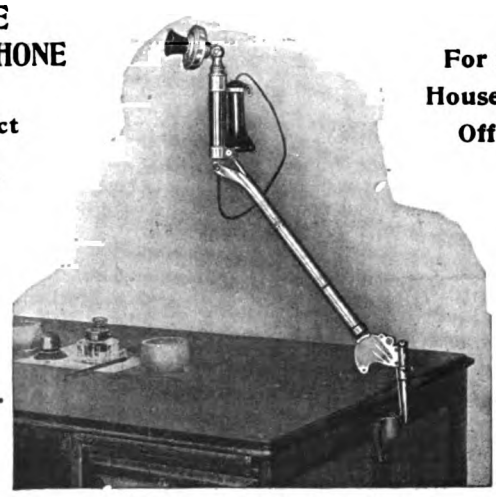
You should investigate the merits of the best device on the market for pulling cable. You will find it much to your advantage to do so. Write us on your letter-head and we will make an investigation possible, without cost to you.

UNIVERSAL CABLE GRIP CO., Syracuse, N. Y.

THE FLEXIPHONE

A Perfect Telephone

For the House and Office



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Where You Want It—When You Want It—And Never In The Way

Cuts Maintenance Cost in Half

MAKES DIVIDENDS GROW

Self-Balancing in any position—Cannot Fall—No Breakage—No Cord Troubles. The Switch mechanism is perfect. All joints soldered excepting Platinum contact points. Simplicity, Quality and Accessibility unequaled anywhere.

Leading makers of Standard instruments will supply the "Flexiphone" equipped with their own Transmitter and Receiver when desired.

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General Sales Agents for New York and New England.

OLIVER MANUFACTURING CO., Philadelphia, Pa.
General Sales Agents for the Atlantic, Gulf and Western States and Foreign Countries.

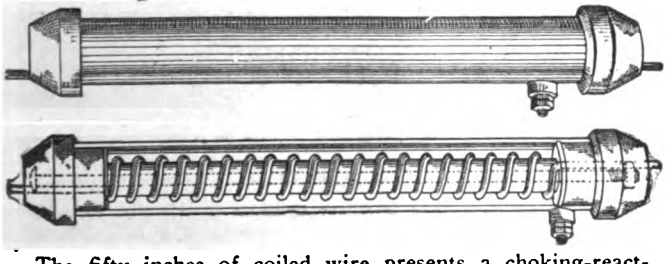
HOLTZER-CABOT ELECTRIC CO., Chicago, Ill.
General Sales Agents for the Middle West.

Send for illustrations of the finest Pedestal and Switch Mechanism ever made

100% INTEREST

and more on your investment, every thunder storm, is assured when you use

Sky Rocket Arresters



The fifty inches of coiled wire presents a choking-reactance coil having a discharge surface of such magnitude that the static charge is always kept below the striking point.

Thus the savings effected by these arresters each storm will equal their cost many times over.

GET A SAMPLE AND PRICES. WRITE TO-DAY

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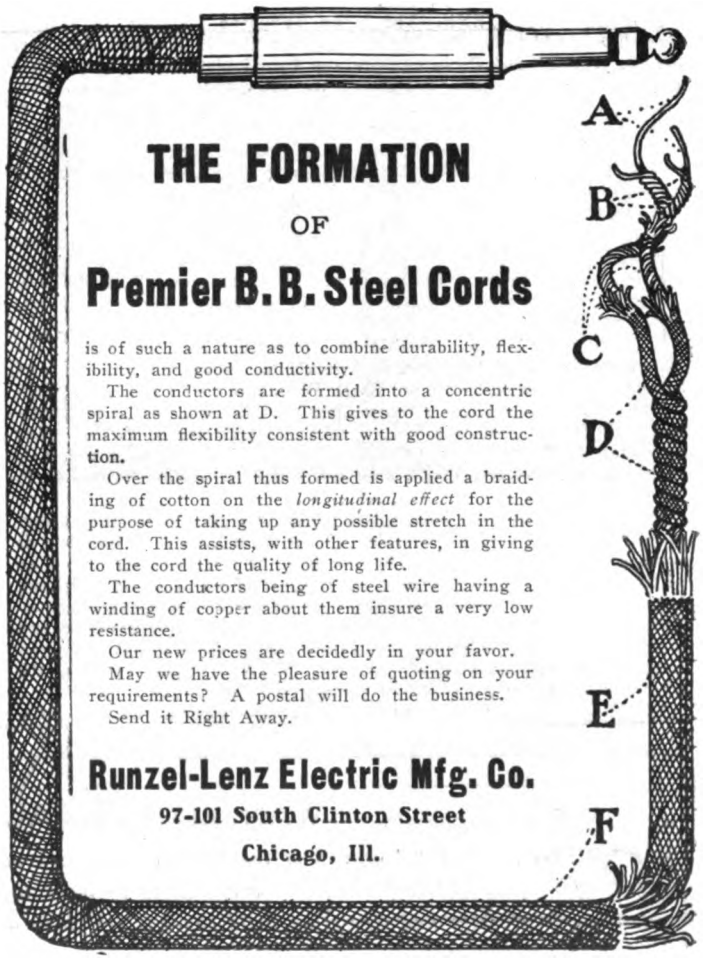

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Premier B. B. Steel Cords

is of such a nature as to combine durability, flexibility, and good conductivity.

The conductors are formed into a concentric spiral as shown at D. This gives to the cord the maximum flexibility consistent with good construction.

Over the spiral thus formed is applied a braiding of cotton on the *longitudinal effect* for the purpose of taking up any possible stretch in the cord. This assists, with other features, in giving to the cord the quality of long life.

The conductors being of steel wire having a winding of copper about them insure a very low resistance.

Our new prices are decidedly in your favor.

May we have the pleasure of quoting on your requirements? A postal will do the business.

Send it Right Away.

Runzel-Lenz Electric Mfg. Co.

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Brief Notes of Progress

NEW COMPANIES.

ARTHUR, ILL.—The Arthur Mutual Telephone Company, whose intention it is to construct and operate telephone and telegraph lines, has been incorporated with a capital stock of $20,000. Among the incorporators are M. Watson, H. Jenne and J. B. Criag.

ELKADER, IA.—Articles of incorporation have been filed by the Highland Telephone Company, whose principal place of business is to be located at Elkader, Ia. It has an authorized capital stock of $800, and the following officers have been elected: President, B. M. Benson, Elgin, Ia., R. F. D. No 2; vice president, Edward J. Erickson, Elkader, Ia., R. F. D. No. 3; secretary, H. H. Vikan, Elkader, Ia., R. F. D. No. 3; treasurer, Peter Larson, Elkader, Ia., R. F. D. No. 3.

BELGRADE, MO.—The Belgrade Telephone Company has been incorporated with a capital stock of $1,500. Among the incorporators are J. A. Easton, Frank R. McNabb, W. E. Nicholson and others.

RED CLOUD, NEB.—The Farmers' Independent Telephone Company has been organized at this city with the intention of constructing and maintaining a telephone system.

SCHUYLER, NEB.—Among the recently organized telephone companies in the Central Telephone Company of this city.

UNIVERSITY PLACE, NEB.—An Independent telephone company, to be known as the University Place Telephone Company, has been organized at this city. The capital stock is given at $25,000. The company's intention is to establish connections with the Lincoln Telephone Company. Mr. Worley is among those interested in the new enterprise.

UTICA, S. D.—An independent telephone company, to be known as the Utica Telephone Company, has been organized at this city, and expects to file articles of incorporation. The company contemplates the erection of lines north from Utica, and the following officers have been elected: Jacob Hauck, president; Jacob Diede, vice president; L. A. Bruce, secretary; John Hauck, treasurer, and Andrew Sayler, Robt. Miller and Nicholas Diede, trustees.

BLOUNTVILLE, TENN.—The Colby Telephone Company, of Colby (P. O. address, Blountville), has been incorporated with a capital stock of $1,500. Among the incorporators are J. L. Mackey, J. H. Pettyjohn, J. F. Yoakley, James Barnes and S. L. Carr.

COLLIERVILLE, TENN.—Articles of incorporation have been filed by the Collierville Telephone Company. It has an authorized capital stock of $5,000, and the incorporators are Sam Hinton, I. T. Ward, W. W. Norfleet, E. A. Johnson and H. Irby.

MORRISTOWN, TENN.—The Home Telephone Company, of Morristown, Tenn., which already owns and operates lines in Hamblen, Grainger, Greene, Jefferson and Cocke counties, has been incorporated. The capital stock is given at $40,000, and among the incorporators are A. W. Lopspeich, Baldwin Harle, W. W. Hobby, M. C. McCanless, H. M. Tate. It is the company's intention to construct new lines through the above named counties, and to establish exchanges at Morristown, Jefferson City, White Plains, Rutledge, Rogersville, Tate Springs, New Market, Greenville and Newport.

HUNTSVILLE, TEX.—The Central Texas Telephone Company, which recently took over a number of Texas companies, has been newly organized with a capital stock of $50,000. The president of the new corporation is A. B. Foster, who has transferred to the company all of his lines, and it is expected that many new lines will be built, as the company possesses valuable franchises and rights of way.

WINNSBORO, TEXAS.—Articles of incorporation have been filed by the Winnsboro Telephone Company, of Winnsboro. It has a capital stock of $15,000 and the incorporators are W. D. Weir, R. L. Weir and C. B. Weir.

BERLIN, WIS.—A new Farmers Telephone Company has been organized at Berlin, and the following officers elected: President, W. F. Lemke; secretary, A. J. Felhaber; treasurer, Frank Reinek. The directory is composed of the officers of the company, and Fred Gertknecht and C. F. Jehn.

MERRILL, WIS.—An independent telephone company has been organized by the farmers of the township of Berlin, and work on the plant is to be commenced very soon. The line is to be connected with the lines of the Merrill Telephone Company, the manager of which, M. R. Thielman, is to have charge of the construction work of the new company. Connections are also to be established with the system at Scott. The officers and directors of the new company are: President, W. C. Granzow; vice president, Carl Bauman; secretary-treasurer, W. A. Voight; directors, the officers of the company and Albert Zamzow and August Elert.

PRAIRIE FARM, WIS.—The Prairie Farm, Ridgeland and Dallas Cooperative Telephone Company has filed articles of incorporation. It has a capital stock of $12,500, and intends to build and operate telephone lines in Barron county.

FRANCHISES.

EUREKA, CAL.—Application for a franchise in this city has been made by the Automatic Telephone Company.

FINLAYSON, MINN.—The North Star Telephone Company, which already operates at this city, has been granted a franchise.

BUTLER, MO.—The manager of the local telephone system at this city, Henry Reinheimer, has applied to the city council for a twenty year franchise, it being his intention, if it is secured, to make many improvements in the plant.

OMAHA, NEB.—The Independent Telephone Company of Omaha has applied for a franchise to construct telephone lines in the city of Florence.

FINANCIAL.

BLENHEIM, ONT., CAN.—A franchise to erect and maintain telephone lines at this city has been granted to the Blenheim and Harwich Telephone Company.

FINANCIAL.

LINCOLNVILLE, ME.—The Lincolnville Telephone Company at a recent meeting decided to increase its capital stock from $5,000 to $10,000.

GRAND RAPIDS, MICH.—The regular quarterly dividend of two per cent has been declared by the Citizens Telephone Company.

FINLAYSON, MINN.—It is the intention of the North Star Telephone Company to increase its capital stock from $3,000 to $5,000, and the additional capital is to be used in improving the company's plant.

LAKEVILLE, MINN.—The Star Telephone Company recently held a meeting at this city, where a majority of the company's stock is represented, and decided to increase its capital from $50,000 to $100,000. The principal place of business of this company is to be at Farmington.

MINNEAPOLIS, MINN.—At a reeent meeting of the North Dakota Independent Telephone Company, held at this city, a semi-annual dividend of 3½ per cent. was declared.

OSCEOLA, WIS.—The Osceola Farmers' Mutual Telephone Company is considering the advisability of increasing its capital stock to $20,000.

ELECTIONS.

MASON CITY, ILL.—The officers of the Mason City Telephone & Telegraph Company are H. F. Reason, president; Dr. C. W. Cargill, vice president; W. A. Grundy, treasurer; J. F. Culp, secretary and manager.

COMFREY, MINN.—The Comfrey Rural Telephone Company has elected the following officers: President, Dr. Prim; vice president, M. B. Harrison; secretary, C. L. Lindersmith; treasurer, Oscar Erickson.

MINNEAPOLIS, MINN.—The following officers were named by the North Dakota Independent Telephone Company at a meeting held in this city: President, H. R. Lyon; vice presidents, J. D. Brown and Robert Jones; treasurer, E. J. Weiser.

JANESVILLE, WIS.—The Rock County Telephone Company has elected the following officers: President, W. H. Palmer; vice president, F. C. Grant; secretary, Richard Valentine; treasurer, A. P. Burnham.

LA CROSSE, WIS.—The following officers and directors have been elected by the La Crosse Telephone Company: President, E. H. Moulton; vice president, W. W. Cargill; secretary, treasurer, manager, W. F. Goodrich; directors, E. H. Moulton, W. W. Cargill, F. P. Hixon, Henry Gund and Geo. H. Gordon.

MENOMONEE FALLS, WIS.—The officers of the Menomonee Falls Telephone Company are C. W. Fraser, president; J. A. Pratt, secretary-treasurer.

COMBINATIONS.

POOLVILLE, TEXAS.—A consolidation has been effected between the Poolville, Whitt and Springtown Telephone systems, and the company is to be known as the Poolville-Springtown Telephone Company.

MISCELLANEOUS.

WILLACOOCHEE, GA.—The telephone exchange at this city, formerly owned by Capt. Wm. Denton, has become the property of J. B. and B. G. Obery. It is Mr. Denton's intention to install an exchange at White Sulphur Springs, Fla.

PEKIN, ILL.—Considerable damage was done to the lines of the Citizens Telephone Company during a recent storm.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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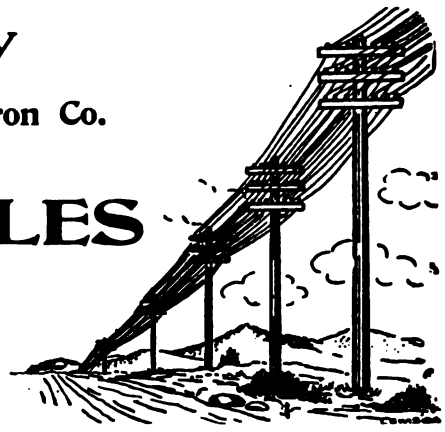
Maine to Washington



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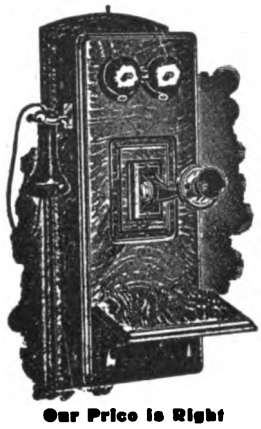
We have a large stock of White Cedar Poles of all sizes, concentrated at a point on the D. & M. R. R. in lower Michigan, from which we can make prompt deliveries. The location of this stock offers exceptional facilities for shipments to all points in Ohio, Indiana, Southern Michigan and the Eastern States. Write us for delivered prices on any size for immediate shipment.

KELLOGG SWITCHBOARD & SUPPLY CO.

CHICAGO, ILL.



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with all connecting wires, binding posts and terminal screws fully concealed

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Brief Notes of Progress

NEOLA, IA.—The franchise right of the Shelby Independent Telephone Company, which has an exchange at this city, have been acquired by the Independent Telephone Company, of Council Bluffs, whose intention it is to establish an independent system in Neola.

WILLIAMSBURG, MASS.—The lines of the Citizens Telephone Company were placed out of commission during a recent storm.

EDWARDSBURG, MICH.—Quite a loss by fire has been experienced by the Home Telephone Company at this city.

UNIVERSITY PLACE, NEB.—Plans for the establishment of an independent telephone system, to be owned by the citizens of this city, are being considered. The plans call for $25,000 capital, and it is expected that connections will be established with the system at Lincoln.

BARTON, VT.—Plans are being considered by the Vermont People's Telephone Company for the absorption of the Barton Telephone Exchange Company.

PERSONAL.

H. B. FOSTER has taken charge of the exchange of the Wisconsin Telephone Company at Watertown, Wis.

CLAY HAMILTON has been appointed district manager for the Missouri & Kansas Telephone Company, with headquarters at Topeka, Kas.

WILLIAM KNIGHT has been appointed manager of its exchange in Norwich by the Southern New England Telephone Company.

H. L. MANOK has assumed the position of manager of the Independent Telephone Company at Taylor, Texas.

ED. PIPER has been appointed manager of the Kearney Independent Telephone Company at Kearney, Neb.

On the Firing Line

WOODLAND, CAL.—A new switchboard has been installed by the Farmers Telephone Company of this city.

LAKE BUTLER, FLA.—Work on the installation of its system is being carried on by the Lake Butler Telephone Company in this city.

DOUGLAS, GA.—Many improvements in its system are being made by the Douglas Telephone Company.

GUYTON, GA.—Among the extensions recently made by the Effingham County Telephone Company is the erection of a line between Guyton and Springfield.

QUITMAN, GA.—The entire system of the Quitman Telephone Company is being rebuilt, and a new switchboard installed.

KENDRICK, IDAHO.—A new line is being built by the Cedar Creek Telephone Company, and connections established with the Interstate Telephone Company.

POCATELLO, IDAHO.—A private telephone line from Pocatello to Inkom, which will give service to the farmers along the route, is to be erected by the Idaho Packing Company. Connections are also to be established five miles from McCammon with the McCammon Telephone Company's lines.

PONTIAC, ILL.—The Livingston County Home Telephone Company expects to commence work on the construction of its system in this city very shortly.

MATTOON, ILL.—Among the many improvements planned by the Coles County Telephone and Telegraph Company are the installation of a new switchboard and the stringing of many thousand feet of aerial cable. It is the company's intention to make its plant thoroughly modern in every particular.

BURROWS, IND.—A new exchange building is being constructed by the Burrows Telephone Company, and a new switchboard is to be installed.

RICHMOND, IND.—Construction work on the Home Telephone Company's new system is being carried on rapidly.

DES MOINES, IA.—Many improvements and extensions in its plant are to be made by the New State Telephone Company.

LA PORTE, IA.—The Farmers' Telephone Company is installing new exchange apparatus and also contemplates the erection of a number of new lines. The system, when completed, will be modern in every particular.

LARKABEE, IA.—The lines of the Spring Cedar Telephone Company in this city are being rebuilt and its plant otherwise improved.

EARLTON, KAS.—A telephone line is being erected by James Bogle, which is to connect with the Earlton exchange.

JAMESTOWN, KAS.—New lines between Jamestown and Beloit are being constructed by the Concordia Telephone Company.

BENTON HARBOR, MICH.—A new system has been installed at this city by the Twin City Telephone Company.

CLAYTON, MO.—To take care of its increasing business, the Kinloch Telephone Company, of St. Louis, has decided to install five additional trunk lines.

DETROIT, MICH.—About $150,000 is being expended by the Home Telephone Company in the installation of its plant in this city.

ELYSIAN, MINN.—A new exchange has been installed at this city by the Cannon Valley Telephone Company, and its system is to be otherwise improved.

NEW ULM, MINN.—Among the improvements planned by the New Ulm Telephone Company is the construction of a line to Brighton. It is also considering the advisability of building additional rural lines.

OMAHA, NEB.—It is the intention of the Independent Telephone Company to spend $60,000 for its new exchange building at Omaha.

PLYMOUTH, N. H.—The Plymouth & Carlton Telephone Company is extending its lines in the vicinity of Beech Hill in order to take care of its increased business.

STRATFORD, N. H.—The Coos Telephone Company is rebuilding some of its lines, and is also erecting additional lines.

WASSAIC, N. Y.—The lines of the Sharon Telephone Company are being extended.

DAYTON, O.—To take care of its increased business, it is the intention of the Home Telephone Company to greatly improve and enlarge its plant.

LIBERTY CENTER, O.—The Farmers Mutual Telephone Company is considering the advisability of establishing connections with Wauseon.

LOUDONVILLE, O.—The Star Telephone Company, which has recently expended $10,000 in improving its system at Wadsworth, contemplates the installation of a new central battery system in its exchange at Loudonville. It is the company's intention to make its entire system up to date.

TOLEDO, O.—The Home Telephone Company is to install an exchange in the administration building of the Toledo schools, which will connect with all of the ward schools and with the various departments of the high school.

BLUFF, PA.—The Hargus Creek Telephone Company has completed its line from Bluff to Rogersville, where connections have been established with the Green County Telephone Company. A line has also been erected from Pine Bank to Bluff, and other construction work is now under consideration.

SUSQUEHANNA, PA.—Extensions in its system are being made by the Susquehanna Telephone & Telegraph Company.

NASHVILLE, TENN.—The Home Telephone Company, of Nashville, is perfecting plans for a large amount of construction work. Independent companies are being organized at many of the leading cities and towns in the Nashville district, and the establishment of the Nashville exchange will place the people of that city in direct communication with the chief centers of trade within a radius of two hundred miles.

HOUSTON, TEX.—A new system at this city is to be installed by the Citizens Telephone Company.

HOQUIAM, WASH.—Work on the plant of the Home Telephone Company, which obtained a franchise at this city some time ago, is to be carried on during the next few months.

PALOUSE, WASH.—The Interstate Telephone Company, which has acquired the system of the Interstate Co-operative Telephone Company, is to erect a new exchange building, and is also to build a number of additional lines.

SPOKANE, WASH.—The Interstate Telephone Company, which is building a pole line between Spokane and Wallace, Idaho, which passes through Moran Prairie, Mount Hope, Rockford and other points, expects to construct lines from Chatcolet to the head of navigation on the St. Joe River, from St. Mary's to St. Joe, and from St. Joe along the St. Joe River to an intersection with the Chicago, Milwaukee & St. Paul Railway. An exchange has been established at Coeur d'Alene, and an exchange building is being erected at Sandpoint, in which a new switchboard is to be installed.

WASHBURN, W. VA.—The plant of the Washburn Telephone Company is being enlarged, the latest extension being a line from Rusk to Pullman.

MADISON, WIS.—Many improvements in its plant at Madison are being made by the Marietta Telephone Company, and new lines are being erected.

MENOMONEE FALLS, WIS.—Among the recent extensions made by the Menomonee Falls Telephone Company are lines to Templeton, connecting with the Lisbon and Merton lines, Germantown and Fussville. A new switchboard is also to be installed at this city.

REEDSBURG, WIS.—A number of new lines have been built by the Reedsburg Telephone Company, and its system otherwise improved.

WAUSAU, WIS.—The Wausau Telephone Company contemplates the erection of a trunk line to Naugardt. Lines have also been built to Rib Falls from Merrill, and from Vicker to Bloomville.

UNITY, WIS.—The Unity Telephone Company is rebuilding its system and extending its lines.

MAPLE GROVE, ONT., CAN.—A farmers' line is being constructed at this city.

UNDERGROUND.

MATTOON, ILL.—Considerable conduit work is to be done in this city by the Coles County Telephone & Telegraph Company.

TROY, N. Y.—Some of the wires of the Hudson River Telephone Company are being placed underground in Troy.

RUTLAND, VT.—The Home Telephone Company, which has been granted a franchise to install and operate a telephone system in this city, is soon to commence a considerable amount of conduit work.

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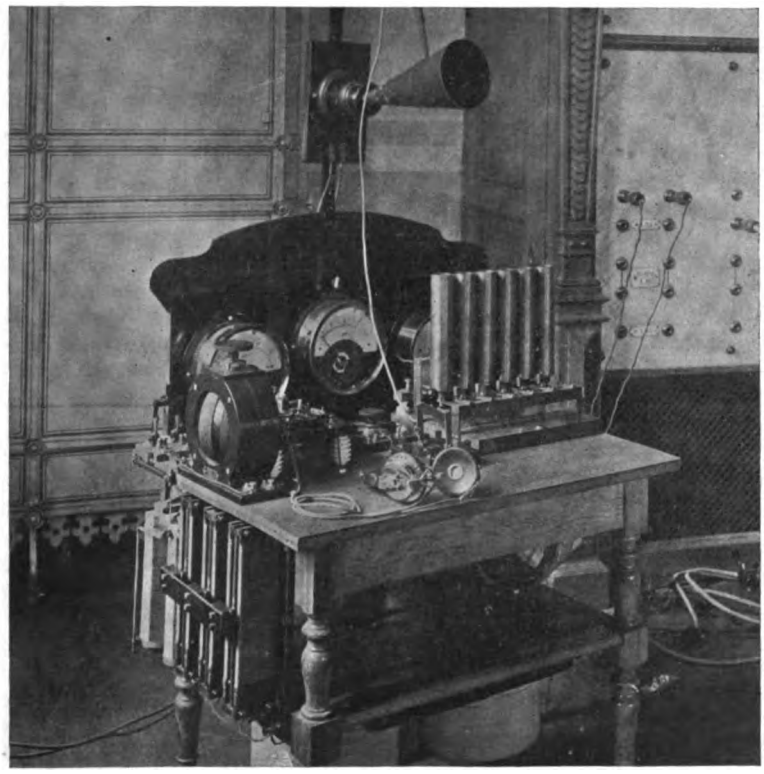
German Apparatus for Wireless Telephony

By Dr. Alfred Gradenwitz.

INVENTORS have been engaged for many years in seeking a solution of the problem of wireless telephony. Whereas E. Rühmer, working independently of the methods of wireless telegraphy, used light waves, instead of electro-magnetic waves, for transmitting between the sending and receiving stations, the principle of wireless telegraphy has been recently made use of by German inventors in their efforts to solve the problem. In fact, the original method due to Rühmer is dependent on the mutual visibility of the two stations and on the conditions of light, and is confined to short distances.

When a few months ago the Danish engineer Poulsen had made public his process of generating undamped electrical vibrations, other inventors (*e. g.*, the Wireless Telegraph Company of Berlin) immediately attempted the generation of similar oscillations, and soon announced that wireless transmission of spoken words could be effected by the same means. Shortly after the first report on Poulsen's invention, Mr. Rühmer submitted to the International Conference of Wireless Telegraphy, then being held in Berlin, an account of his new system, in which the principle of speaking lamps (which had been utilized already in his optical telephony) was combined in an appropriate way with the Poulsen apparatus. Shortly afterwards the first experiments of the Gesellschaft für drahtlose Telegraphie became known, which company soon stated that it had succeeded in obtaining satisfactory communication between Berlin and the radio-telegraphic station at Nauen, a distance of 40 km. These experiments then were continued permanently, so that the problem is likely soon to enter on a commercial stage. The following is a brief description of the apparatus used by the Wireless Telegraph Company:



Apparatus Used by German Experimenters in Wireless Telephony.

For generating undamped oscillations there is used an arrangement similar to speaking arc lamps, that is, utilizing the faculty of direct current arcs to generate in an oscillatory system parallel to the arc (and comprising a condenser and self-induction) oscillations the frequency of which is equal to the oscillations of the circuit, and which can be maintained with constant period and amplitude for any length of time with variations of approximately 1 per cent. The antenna is inductively coupled to the self-induction of the oscillating circuit. The energy supplied to the antenna in virtue of this coupling is varied in talking by means of a conveniently inserted telephone transmitter.

The electrical vibrations emanating from the antenna into space are influenced by the transmitter, as to their amplitude, in accordance with the variations of sound waves. By virtue of these alterations the spoken words are made audible in a telephone at the receiving station.

The receiving or hearing of words is effected by means of a telephone and Schloemilch detector, the arrangement of the receiver being similar to the arrangement in wireless telegraphy. The wireless telephone plant is represented in the illustration.

The connection to the direct current circuit is effected by means of the switchboard, situated to the right of the apparatus desk. The conductor leads across the main switch, visible at the left hand back edge of the desk, to the regulating resistances mounted sideways on the desk, and from the latter across the throttling coils (with or without iron core) arranged below the desk, and a direct current ammeter fitted to the right on the back wall of the latter, to the main organ of the plant; *i. e.*, the arc lamps.

Six series-connected arc lamps are used, which require a working tension of 220 volts, with a direct current intensity of four amperes. These arcs are produced between a carbon and a cooled copper electrode, their length being adjusted by finely threaded screws.

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The carbons are burned away extremely slowly, so that the arcs have to be shortened somewhat by means of a common screw only from time to time. The copper electrodes are formed by the bottoms of cylinder-shaped vessels containing cooling water.

The terminal screws of the arc lamps are connected to a condenser (to the left of the lamps), a hot-wire ammeter (above the condenser) and the self-induction (to the right below the desk).

This high-frequency oscillating circuit accordingly comprises a condenser and self-induction, the arcs and a measuring instrument, the wave length being controlled by adjusting the condenser.

Beside the self-induction of the oscillating circuit there is seen a coil comprising a few windings, which serve for coupling the antenna. Below the desk there is arranged the transmitter with the acoustic funnel. The antenna circuit further comprises a hot-wire ammeter (to left on the desk), which allows the influence of the transmitter on the antenna to be checked. The switch in the middle of the desk serves for passing from "talking" to "hearing." By means of a single manipulation the high-frequency circuit is interrupted, the antenna switched from "sending" to "receiving" and the receiving apparatus connected.

During operation the telephone is kept close to the ear, it being only necessary to turn the switch from the right to the left in order to pass from inquiry to answer.

Beside the rotary condenser in the middle of the desk there is situated the receiving apparatus, which contains on a hard rubber plate resting on four porcelain insulators the Schloemilch detector with regulators and accessories, and the plug connections for the telephone. To the left of the receiving apparatus there is placed the variometer, that is an apparatus comprising two concentrical coils, the relative position of which is altered by rotation. By means of the variometer, the antenna and the receiving circuit are tuned to the incoming oscillations.

A Simplex Telephone and Telegraph Circuit for Electric Railway Dispatching Lines

By E. R. Cunningham.

A SIMPLEX telegraph and telephone system which differs very materially from any other in general use, and which has many features to recommend it, especially for inter-urban dispatching lines, has been worked out by the Inter-Urban Railway, of Des Moines, Iowa. The following description may be of interest to those who have occasion to operate dispatching lines under similar conditions.

The line as originally installed was intended for the telephone dispatching line, to dispatch the cars on the Beaver Valley Division of the Inter-Urban Railway, and consisted of two No. 9 BB galvanized iron wires from Des Moines to Moran Junction, where the line branches; the branch line running four miles to Woodward, and the main line running twelve miles to Perry. The Perry end of the main line is thirty-six miles from Des Moines, the Woodward end of the branch line being twenty-eight miles from Des Moines. The telephone line was carried on standard cross arms on the same pole and below the high tension transmission line, and was transposed every ten poles by means of a special transposition pin and insulator designed especially for the use of the railway. The telephones used on this line were of standard make and bridged across the line in the usual manner, one being used at each station and passing point on the line. In all there are fourteen telephones bridged across the line. The dispatching switchboard is located at the Des Moines end of the line and is a fifty line central energy switchboard with ten lines now wired up, one of which is the Beaver Valley dispatching line. Besides being used for dispatching purposes this line was also used for transmitting messages arising from freight, express, passenger and other departmental business, and it was found necessary to either build another telephone line for the commercial business, or equip the present line with telegraph instruments, making a dual use of the one line. The latter plan was found to be much the cheaper, as it necessitated but a nominal expense for the telegraph instruments, and was adopted not only because it was cheaper, but because it was thought to give a more extended and reliable service than two separate telephone lines. It was quite natural in adopting the telegraph system to be used on this line, to fall into the well-beaten path of American telegraph practice of connecting the telegraph instruments in series. To do this, however, necessitated the use of at least eight condensers cut in the telephone line.

Figure 2 illustrates one of the usual methods of connecting telegraph instruments in series on a simplex telephone and telegraph line. Since both sides of the telephone line are used as one side of the telegraph line it is necessary, at each intermediate telegraph station to cut a condenser in each side of the telephone line in order to open the line to the DC telegraph current and cause it to flow through the telegraph key and relay.

In using the telephone it is necessary to signal and talk through these condensers, and while they do not interfere with the small undulating voice currents used in talking, they do seriously interfere with the signalling current, especially where there is a large number of telephone instruments bridged across the line. Condensers are very delicate and are an expensive fixture on a long dispatching telephone line, especially where it parallels and is in close proximity to high tension and power lines. They are so sensitive and delicate that they are continually being knocked out, not only by lightning, but by induced static and stray currents from other lines.

In the composite series system these condensers have to be kept in proper order at each station where a telegraph instrument is cut in to the telephone line, or the line will be unbalanced and the telegraph current will interfere with the telephone service. To avoid the use of these expensive and troublesome condensers and to secure other very desirable results, that will appear later, the engineers of the railway decided to connect the telegraph instruments in multiple, more after the Continental or European telegraph practice than the American, the telegraph relay being cut in as illustrated in Figure 3 between the neutral point of a suitably wound impedance coil, bridged across the telephone line, and ground, through about 1,000 ohms resistance.

The telegraph key, which is an open circuit key (key without a lever switch) is cut in from some source of energy in multiple with the relay. As the 500 volt DC railway circuit is available at each telegraph station the key is connected in between the fourth and fifth lamps in a series of five 16 candle power lamps, as illustrated in Fig. 3, so as to obtain about 100 volts on the telegraph line. For the fifth or ground lamp four 16 candle power lamps in series, multiple, as illustrated in Fig. 3, were used. These have the same resistance as one lamp, but being in multiple there is no danger of the ground side of the series opening and thus throwing full potential onto the telegraph line.

The sounder is connected in the usual manner, either with local battery, which in this case can be ordinary dry batteries, since the sounder is on open circuit when not in use; or by shunting the ground light in a series of five incandescent lights in the same manner as power is obtained on the line.

All telegraph instruments on the line, when connected in mul-

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tiple are of course connected up exactly alike, and require but one impedance coil to each telegraph station and no condensers. They are all independent of each other and any one of them can be cut on or off the line at any time by opening the double pole knife switch.

Another advantage of the multiple system is that it is impossible for the operator to go away and leave the line open by leaving his key open. If the series system were used it would require two impedance coils at each intermediate telegraph station, and two condensers as illustrated in Figure 2.

Another very important feature of the multiple system is that the neutral point of every impedance coil is connected to ground through the relay and about 1,000 ohms of non-inductive resistance. This on lines paralleling high tension lines serves to carry off the static charge, which otherwise would accumulate on the telephone line.

It is a well known fact that both sides of the telephone line sometimes acts as a secondary to the high tension line and that a high and dangerous accumulation of static electricity is induced on the telephone line. These impedance coils are so wound and connected that they act as impedance to the undulating voice and A. C. telephone signaling current flowing from one side of the telephone line to the other, but do not act as impedance to current flowing from both sides of the telephone to the ground. Therefore the static or other stray current of small volume but high potential can pass unimpeded from both sides of the telephone line to the ground.

On account of the sensitiveness of the telephone receivers to even a slight flow of current, they are very seriously affected by small induced currents from other lines which parallel the telephone line, especially from lighting, power and high tension lines. It is important, therefore, to have a well constructed telephone line. It must be perfectly balanced as regards resistance, impedance, inductance and capacity; that is, it must have the same resistance, impedance, inductance and capacity in each side of the circuit. Not only must each side total the same, but each side must have the same amount between each talking station. The line must be so transposed that each leg of the circuit shall occupy and travel in the same zone or position relative to other parallel lines and conductors half of the distance between each talking station.

The line must be properly insulated, not only from all other lines, but from the ground and all other objects having capacity and which would unbalance the circuit by adding capacity to one side or the other.

The greatest source of trouble and the one most difficult to overcome on telephone dispatching lines arises from two opposite and opposing conditions, both of which seem to be necessary, one for the operation of the line and the other for the protection of the same, and those who have occasion to use it, from a dangerous difference of potential which is liable to be induced from the high tension lines. A difference of potential of 300 to 400 volts will discharge across the protectors commonly used on the line, leaving the line safe but not very serviceable, as the capacity of the grounded side is increased so as to unbalance the circuit and cause a continuous flow of current through the receivers on the line from one side of the circuit to the other, making the line so noisy that it is practically inoperative. These protectors or ground devices are usually carbon plates separated about one one-hundredth of an inch by perforated mica or celluloid, one of them being connected to one side of the telephone circuit and the other to the ground, and when a discharge takes place from one carbon plate to the other it usually blisters it and leaves the line permanently grounded and it is then necessary to go over the line and clean the protectors. Dust and dirt is also liable to collect in these protectors and ground the line with the same result.

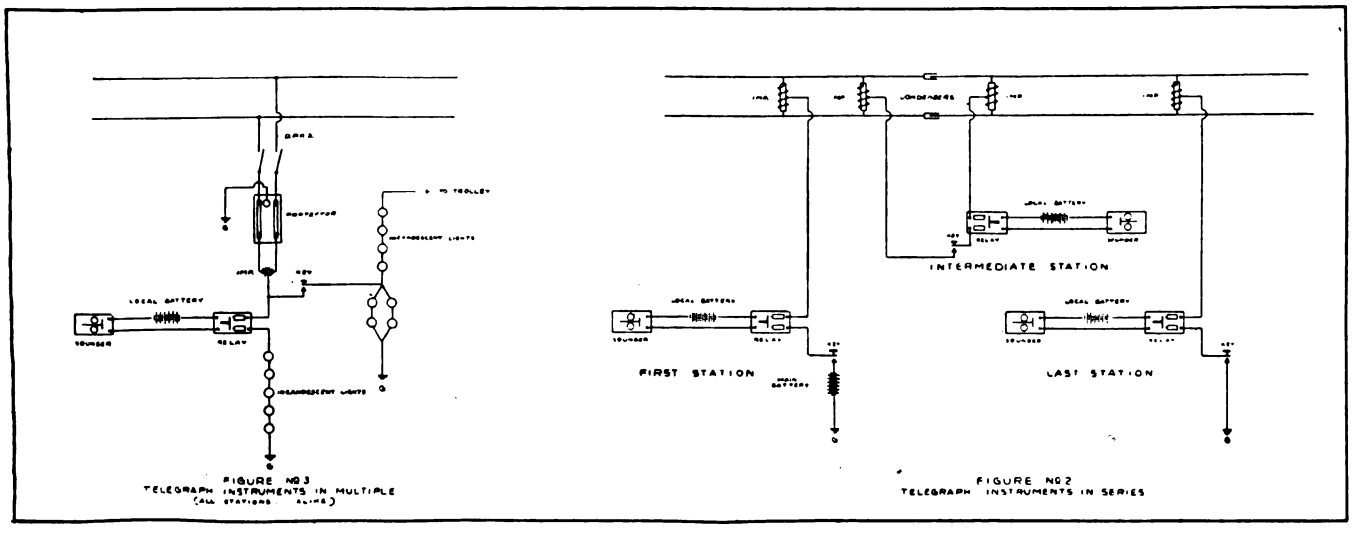
Thus you are between the "Devil and the deep blue sea" all the time. You must not let your line touch the ground and yet you must keep it within one one-hundredth of an inch of the ground in many places.

It is from these two opposite and opposing conditions that nearly all the trouble on telephone lines paralleling a high tension line arises.

Since the installation of the telegraph instruments on the Beaver Valley dispatching line most of the above trouble has disappeared on account of the neutral point of the impedance coils being grounded and carrying off the static and other stray current which otherwise would accumulate and discharge across the protectors and blister them.

The success of any simplex system depends of course upon both sides of the telephone line having the same resistance, capacity and inductance, the same as any ordinary telephone line. In other words, the line must be perfectly balanced and when it is perfectly balanced the telegraph direct current impulses have no tendency to pass from one side of the telephone circuit to the other through the telephone receivers, and therefore there are no disturbances between the telegraph and telephone service. Since it is necessary to have a well balanced line to prevent disturbances to the telephone from high tension and other parallel lines, the use of the telegraph on the same line as the telephone does not necessitate any further care than would be necessary for any satisfactory operating telephone line.

A simplex system not only doubles the amount of business that can be handled over a single line, but is much more reliable and convenient than either a telephone or telegraph line alone. It is much more reliable because the telegraph and telephone services are not both subject to the same troubles. What would knock out or disable one might not affect the other. Although the telephone is more sensitive both to atmospheric disturbances and to induced currents from other lines, and consequently is less reliable than the telegraph, yet it is more convenient than



Ordinary Retardation Coil Simplex Line, and Connections Employed on the Inter-Urban Railway Line.

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the telegraph for handling a certain class of business, such as reporting cars at passing points and places where there is no operator, and for reporting break-downs and interruptions to service, and all kinds of business where it is necessary to get in close touch with the party addressed and where quick action and an immediate response is required and where one does not wish to talk through a second party, the operator, but wishes to personally communicate with the party addressed. There is sometimes a great deal of satisfaction in being able to talk directly to the train crews, sub-station attendants, and other employees, and for this class of work the telephone is most desirable. For other classes of work where one does not care for a personal interview, a telegraph line has its advantages.

The great trouble with the telephone for dispatching purposes is that it is so delicate and sensitive. The reason for this is that no one has yet been able to design a transmitter that will handle more than a very small amount of current. Transmitters are designed to operate on two to four volts, and as their resistance is from ten to twenty ohms they consequently will not transmit over about one watt, which is an infinitely small amount of current, consequently the receivers have to be made so very sensitive and delicate in order to pick up this small amount of current that they pick up foreign and induced currents from adjacent and parallel lines and consequently are very noisy, unless the line is so built as not to be affected by foreign current.

If a transmitter could be designed to handle, say, 100 watts, then the receivers could be made less sensitive, so that they would not be affected by small quantities of induced current from foreign lines, and would not be affected by atmospheric conditions. The simplex system has all the advantages of both systems with very little additional expense, and introduces no new troubles or complications and the liability of the simplex system to become inoperative for both telephone and telegraph services is very greatly diminished, since, as stated before, they are not both subject to the same troubles.

WESTERN MANITOBA FALLING IN LINE FOR GOVERNMENT TELEPHONE SERVICE.

CONTRACTS for the government telephones in the Western municipalities are being sent in in large numbers to the provincial department of telephones and telegraphs at Winnipeg, Man. The councillors, in many cases, take charge of the work and are pushing it along as rapidly as possible.

Telephone Transmission Measurements*

By B. S. Cohen and G. M. Shepherd.

SOME difficulty was experienced in finding a suitable transformer for use in connection with the measurements referred to in last week's issue, presumably on account of complications occasioned by iron losses at the moderately high frequencies used to imitate speech currents, and also by variations of transformation ratio. An air-core transformer would probably have been a cumbrous and costly piece of apparatus, for it had to be borne in mind that, as the secondary winding was across the telephone circuit, a high inductance was imperative. A toroidal coil having a core composed of iron wire of about No. 40 S.W.G. was finally adopted. The dimensions of this core were approximately 11½cm. external diameter, sectional area 7 square centimetres, depth 5cm. The two windings had about 2,000 turns and 100 turns respectively, and the ratio of transformation experimentally determined ranged from 96.5 to 19.3, according to the number of secondary turns employed. A series of preliminary tests was made with the above described combination, using artificial loads made up of known non-inductive resistances, capacities, and inductances; and the results, though not of a very high order of accuracy, were yet encouraging when the difficulties were considered. The thermo-galvanometer, as mentioned previously, when worked up to its greatest sensibility, was found to be extremely sensible to outside disturbances of various kinds, and much trouble was experienced from leakage and capacity currents in the test circuits. When the frequency is even no higher than 800 cycles the term "non-inductive," as usually applied to resistances, requires qualification; and, unless care be taken, very erroneous conclusions may be arrived at. Some results using this apparatus are given in Table 3.

Apparatus tested.	Current.	Actual watts.	Apparent watts.	Power factor.	L.	Effective R.	Cycle.
C.B. receiver..	0.00695	0.00858	0.01435	0.600	0.0425	165	825
120-ohm rec'ver	0.01160	0.02220	0.02930	0.760	0.0280	165	825
120-ohm receiver and induction coil	0.00220	0.00139	0.00247	0.562	0.0650	227	825
C.B. repeater, type 25C., with 150-ohm subscribers' line.	0.00208	0.00149	0.00218	0.685	0.0690	320	800

Table 3. Results of Measurements of Power Absorbed in Telephone Circuits, Apparatus as Indicated in Fig. 18.

A test of sending end impedance of 30 miles of 20lb. paper telephone cable, far end open, gave the figures shown in the following table:

Current.	Watts.	Power factor.	Phase angle.	Impedance.	Cycles.
0.00658	0.0163	0.71	44° 48′	552 ohms	810

This is in good agreement with the theoretical estimate of the impedance of this class of cable—viz., 550 ohms and phase angle 45 deg.

All the above described tests were made with current supplied by the small inductor alternator previously referred to using its natural wave-form. In these days of the sovereignty of the two-coil wattmeter one scarcely cares to mention the three-voltmeter method, but as a matter of fact this method was found very convenient for certain measurements of the efficiency of induction and repeating coils. The instrument used was an Ayrton-Mather electrostatic voltmeter having a readable range of about 1 to 10 volts. By switching over quickly into the requisite positions on the circuit quite consistent readings could be obtained. An excellent point in favor of this voltmeter in connection with telephonic measurements is its negligible working current. It is a little disconcerting to find that the efficiency of conversion between the primary and secondary circuits of a telephone is of the order of 1 per cent., though when used as an ordinary transformer, at about 800 cycles passing a current of a few milliamperes, the efficiency of the best type of induction coil is quite high—viz., about 72 per cent. The low efficiency in the former case is, of course, due to the large constant component of the current in the primary. A slightly higher efficiency was found for a coil of the toroidal pattern, but, unfortunately, improvements in the direction of a closed magnetic circuit have not so far proved feasible for induction coils.

We have also applied the three-voltmeter test to the determination of cable constants at working frequencies. This method seems to have been used to some extent by Dr. Breisig, of the German Telegraphs, who, however, employed apparatus of a special kind to measure the phase of the entering current. In the experiments made in the National Telephone Company's laboratory the cable line to be tested was connected to the high-frequency generator through non-inductive resistances inserted in either leg, and the watts, current, and voltage observed when (1) the distant end was open, and (2) when it was short-circuited. From these two sets of correlated readings the im-

*Abstract from a paper read before the Institution of Electric Engineers, London, continued.

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pedances at the sending end are specified completely as vectors, and thence the four constants, R, L, S, and C, may be deduced. As experiments in this direction are at present only in their initial stages we are unable to say much about them. Cables of the ordinary telephone types are notable chiefly for their high copper resistance, very small inductance, and high insulation; consequently the evaluation of the inductance and leakage constants depends on the possibility of very accurate phase measurements correct to a few minutes. This is a matter of considerable difficulty, and the examples given in the table in the adjacent column must be regarded as trial endeavors.

Currents used were from six to ten m.a. with potential differences of two or three volts. The figures for resistance and capacity differ very slightly from what would be obtained by direct-current measurements. The constants L and S in the case of the 20lb. cable are possibly doubtful, owing to the phase-measuring difficulty referred to, but there is good reason to believe that there is a very considerable reduction in the effective insulation of paper cables at telephonic frequencies. It is hoped that further investigation along these lines will lead to more precise results.

Line.		Impedance. End open.	End S. C.
10m. 20lb. standard	.....	495—54° 20′	657—29° 18′
10m. 20lb. artificial	.....	498—51° 28′	644—36° 6′

		R.	C.	S.	L.	Cycles.
10m. 20lb. standard	.....	82.4	0.0540	$7,12\times10^{6}$	0.00145	750
10m. 20lb. artificial	.....	94.0	0.0624	—	0.00020	750

The Extension Station as a Valuable Adjunct to Regular Service

By W. W. Kingsley, Jr.

THE telephone, being designed primarily to serve man, must needs serve him in as efficient manner as possible. If, after a line has been installed, with but comparatively small additional outlay the service can be bettered and time saved, then that outlay may be justified. The extension station may be found to give these results, and so a study of some of the circuits which are at present in successful operation may not only prove immediately beneficial to the subscriber but may be found to be useful by the operating company in introducing to the subscriber the larger advantages of the telephone and thereby developing the telephone habit which finally demands private branch switchboard facilities. The use of special circuits in extension set practice has been found to fit the second, or auxiliary instrument, to many particular conditions which can be met economically in no other way, and an intimate knowledge of the different arrangements which are possible is very often of the greatest utility in enabling a telephone manager to add instruments in such a way as to at the same time increase his revenue and make the service more convenient and pleasing to the subscriber.

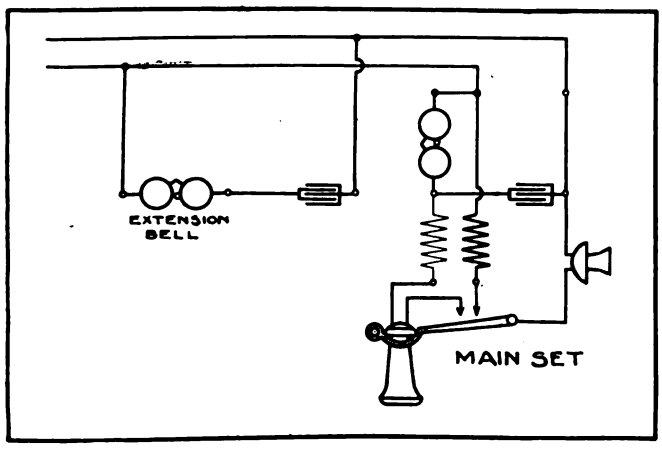

Fig. 1. Wiring for one regular telephone instrument and one extension bell. Other bells may be connected in multiple.

In selecting the circuits mentioned in this article, an attempt has been made to include only the basic ones in the groups concerned with (1) auxiliary apparatus, (2) two instruments per line, (3) more than two instruments per line, and (4) more than one line per group. Combinations of these groups or of the individual circuits may readily be made but it is not deemed advisable to describe them here, as the wiring becomes unduly involved. Private branch exchange switchboards, under these conditions, can generally be shown to be more desirable. Common battery wiring only will be considered, but similar local battery circuits can readily be devised.

The simplest form of extension for a telephone station is that which requires as an auxiliary instrument only an extension bell. This is connected in multiple with the regular instrument (Fig. 1), and may be located at any convenient point. This service is hardly to be described as a means of reducing the time required at the telephone. In fact, its effect is usually quite the reverse in this respect. Its true function is to increase the reliability of the service by eliminating opportunities for lost calls.

The installation of this apparatus is so common that no comments on appropriate locations, etc., are necessary. If a company should wish for any reason to equip many of its lines in this manner a record of "don't answer" reports should be made by operators, and all stations which seem to furnish more than a proper share of such reports may be visited by a solicitor.

The extension bell, proving helpful, argues for the installation of an extension station (Fig. 2). As both bells ring whenever a call is received, the chance of losing calls due to a single bell getting out of adjustment is minimized and the nearest instrument may be used for answering. This equipment adds the element of convenience to that of certainty which is implied by the installation indicated in Fig. 1.

Should the subscriber find that two bells are undesirable, as in an office room, either one might be disconnected or a key

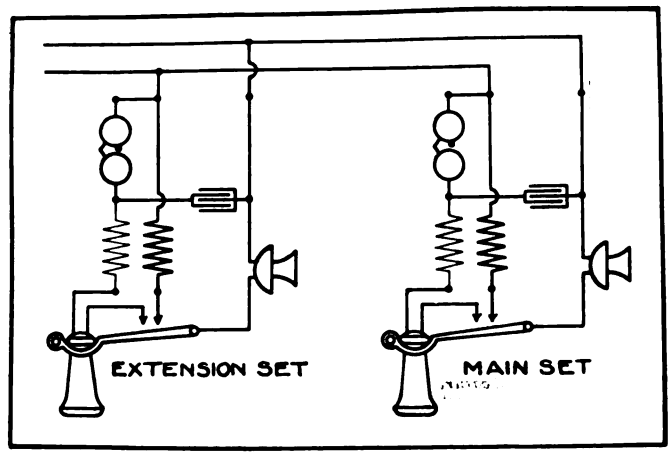

Fig. 2. Arrangement of main set and single extension set.

installed to cut off either one of the instruments or bells at will (Fig. 3). In this particular figure the entire extension set is

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removable from the line by throwing the key. Should it be desired, however, to receive calls at this instrument without disturbing the person who normally answers the main set this object may be attained by throwing the key at the main set, which simply disconnects the bell.

As it very frequently happens to be desirable to have all calls answered by a subordinate, a combination must be devised so that the superior will be called only when necessary. In Fig. 4 is shown such an arrangement. With the listening key in the position shown, either station may call, but all incoming calls come to the station to be answered by the subordinate. If the extension station be wanted he turns the generator while his receiver is still off its hook, as hanging up would, of course, give the central office a disconnect signal. The main station may hang up when he hears the extension station answer. If the extension station desires privacy the listening key is thrown, converting the station into a regular one and at the same time short-circuiting the main station, thus preventing "listening-in" inducively, which would not be the case were the line merely opened. With the key in its normal position either station may call.

(To be continued.)

U. S. FOREST SERVICE ISSUES TWO NEW BULLETINS ON WOOD PRESERVATION.

CARL G. CRAWFORD, Chief, Office of Wood Preservation of the United States Forest Service, Washington, D. C., is the author of two new bulletins issued during the month of July. One of them bears the title "Brush and Tank Pole Treatments," and the other "The Open Tank Method for the Treatment of Timber."

The first bulletin describes the results obtained by treating a considerable number of poles with a preservative applied with a brush. The lower portion of the pole was selected for treatment, in accordance with standard practice, this being the most subject to decay, and from one to three coats of the preservative were applied according to the directions received from the manufacturers. Most of the preservatives were heated to a temperature of from 150 to 175 degrees. Particular attention was paid to filling checks and knot holes, and to working the preservative into the wood; and careful notes were made of the condition of the pole as regards checks, knot holes, etc. The amount of preservative absorbed by each pole was determined, and records made showing this quantity, as well as the temperature of the preservative before and after the treatment, and the depth to which it penetrated into the wood. Figures for this latter quantity were obtained by boring test holes into different portions of the treated portions of the poles.

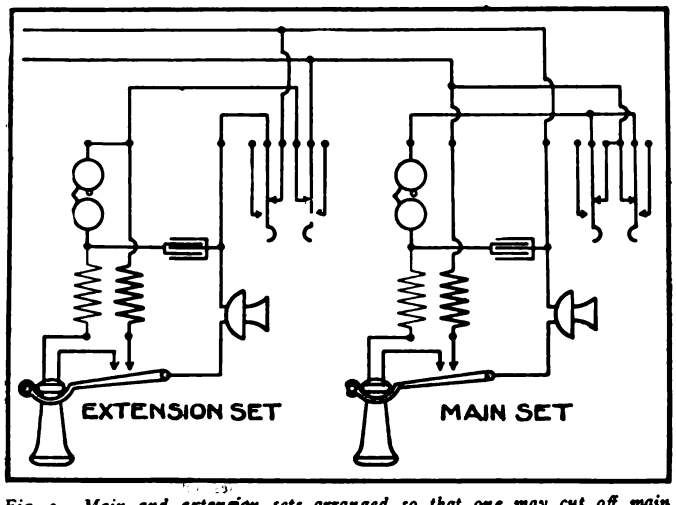

Fig. 3. Main and extension sets arranged so that one may cut off main bell, or the extension instrument.

In addition to the poles treated with a brush, 160 seasoned and 24 green chestnut poles were treated by the open talk method described in the bulletin. Comparative figures of penetration of the two processes showed that with the brush treatment the preservative entered the wood through from two to three annual rings, a distance ranging from 1-16 to ¼ of an inch, the penetration seeming to be slightly greater in chestnut than in cedar. The open tank treatment gave an average penetration of about one-half inch. The actual figures varied between one-quarter inch and one inch, according to the character of the particular specimen. It was found that in brush treatments it was impossible to note any characteristic difference in absorption or penetration due to the season of cutting. In the

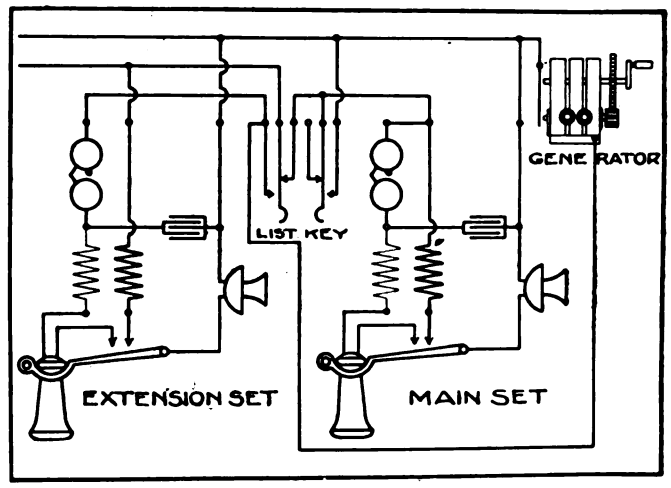

Fig. 4. Arrangement for receiving calls at main and transferring them to extension set.

tank treatments, where only one preservative was used, there was, however, apparently a marked difference; the Spring cut poles absorbed the most, the cuts of Winter, Summer and Autumn following in the order given; while the thoroughly seasoned poles allowed the preservative to penetrate to a greater depth than others, no matter which method of treatment was applied.

Experiments tending to show the effect of water soaking on the absorption of the preservatives applied with a brush seemed to indicate that no difference existed.

The bulletin gives figures derived from these experiments, which have enabled the department to work out the cost of such treatment and these figures tend to show that such treatment of the poles will undoubtedly be profitable. More exact figures showing the amount of profit which might be expected from treatment similar to that carried on by the department can, of course, be obtained only at the conclusion of the observations which will be made from time to time upon the poles dealt with, which have been set and will be the subject of continued observations, records of which will be made public.

The bulletin covering the open tank method of treatment describes the method and relates the theory of the treatment, and a description of the necessary apparatus is also given. This bulletin is rather a general bulletin, which will be especially interesting to those who have occasion to undertake experiments in preservation for their own information or practical use.

FRANCHISE INVALID AT DENVER.

BY a decision of the Supreme Court of Colorado, in an opinion written by Justice Gabbert, the franchise of the Independent Telephone Company has been declared invalid on the ground that the election at which the company was granted telephone and telegraph privileges, in the city of Denver, was illegally held. On the face of the returns of the election held November 6, 1906, the new company won its franchise by a popular majority, but the court maintained that the franchise matter should have come up at a spring municipal election and not a fall State election. The law provided that the franchise should be submitted at the "next general election," which the court held to be the spring and not the State election.

The court also ruled that the right to count votes at an election is political and not judicial, and hence the lower court exceeded its right in granting an injunction restraining the county clerk from making a certified count of the votes at the

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election in November. Although, by this ruling, the county clerk may make a canvass of the votes, it will not be done, as the decision of the court expressly states that the election was illegal, and it would therefore be a waste of time to count the ballots. On the first count the franchise was evidently carried, but when the county clerk began to make a certified canvass of the returns, A. E. Wilson and others interested in the company applied to the District Court for an injunction to stop the making of the official canvass. The case is remanded to the District Court with directions to dismiss the complaint.

The telephone company may ask for another vote on the new franchise at the coming spring election.

The Seasoning of Telephone and Telegraph Poles

By Henry Grinnell.

THE scarcity of timber suitable for telephone and telegraph poles has of late assumed serious proportions. To users of poles, therefore, the question of how best to meet this situation is of first importance. Latest reports of the Census Office show that there were in operation in 1902 approximately 700,000 miles of pole line. Subsequent additions, however, together with certain railroad pole lines not reported, would enlarge this figure. It is safe to assume that there are in operation at present fully 800,000 miles of line. The average line contains about 40 poles per mile, so that there are approximately 32,000,000 poles in use. Assuming that the average life of a pole is twelve years, it follows that for the maintenance of the lines now in operation there are needed each year more than 2,650,000 poles. Such an enormous demand must soon deplete the available supply. This is fully recognized by the different companies.

The experiments which are here described were conducted in co-operation with the American Telephone and Telegraph Company, and are among a number carried on by the Forest Service to determine the best means of prolonging the length of service of poles and other timbers, to the end that the number required each year for repair and maintenance may be reduced and the overcutting of the forest checked.

In Bulletin 41 of the Forest Service the seasoning of timber is discussed in detail, and it is shown that seasoned timber in contact with the ground will outlast unseasoned, and that dry wood is more receptive of preservative fluids than green wood. The results of the experiments indicate very clearly that definite laws regulate the seasoning of timbers. These experiments, however, were concerned especially with the seasoning of ties. Regarding the time required to season poles to an air-dry condition there has been a wide difference of opinion. To answer this and other related questions the Forest Service undertook the present experiments in the seasoning of poles of two important kinds of wood.

The tables contained in this circular have been compiled from data collected since 1902. Though the experiments have not been carried far enough to admit the formulation of definite laws, the results are sufficiently clear to form the basis of some important conclusions.

Questions Involved in the Experiment.

The questions involved in experiments to prolong the length of service of timbers fall naturally into two groups: (*a*) those which pertain to the rate of seasoning and (*b*) those which pertain to the preservative treatment and durability. The present circular deals only with those forming the first group Those taken up are:

(1) At what rate does seasoning progress in telephone poles?

(2) Does the time of year when timber is cut affect its seasoning?

(3) Does the time of year when timber is cut affect its specific gravity?

(4) How much shrinkage occurs in air-seasoning?

(5) What are the causes of the checking of poles during air-seasoning?

(6) What is the best season for cutting poles?

Experiment stations were established at Dover, N. J.; Thorndale, Pa.; Pisgah, N. C., and Wilmington, N. C. As a part of the terms of co-operation, the American Telephone and Telegraph Company supplied a fixed number of poles each month.

Dover, N. J.—The Dover station comprised two substations in New Jersey—one at Mount Arlington, the other on the hills above Lake Hopatcong, near Minnesink, both about 43 miles from New York. The elevation of Mount Arlington is about 775 feet and that of the station above the lake about 1,000 feet. The substations were about three miles apart and the timber was identical; the results, therefore, may safely be merged. Here the first pole-seasoning work was begun in July, 1902. Fifty 30-foot chestnut poles were cut each month for eight months during one year, making a total of 400 poles at this station.

Thorndale, Pa.—The Pennsylvania station also comprised two substations—one at Thorndale, about 35 miles, and the other at Paoli, about 20 miles, from Philadelphia, on the Pennsylvania Railroad. These stations had practically the same elevation and situation, and though the timber at Thorndale was slightly older than that at Paoli, the difference was not sufficient to affect materially the result. The elevation ranges from 300 to 325 feet.

Pisgah, N. C.—To compare the rate of seasoning of northern and southern grown chestnut, a station was established in North Carolina in May, 1903. It was on the north slope of Mount Pisgah, at an elevation of about 4,500 feet, and about 12 miles from Hominy, on the Murphy Branch of the Southern Railway. The timber was young and of rapid growth. Timber while seasoning at this station was subjected to very drying winds. During the warmer weather it was frequently wet by rains, and in winter it was exposed to cold, but to little snow. The combination of these conditions accounts for the comparatively rapid rate of seasoning shown by poles at this station. Cutting was begun in June, 1903, and continued until the following May.

Wilmington, N. C.—This station was established in August, 1903. It was at the Smith Creek yard of the American Telephone and Telegraph Company, at an elevation of about 30 feet. During the summer the weather is very hot and dry, and timber seasons with great rapidity. In winter there are frequent cold rains, and seasoning is greatly retarded. Taking the whole year through, poles at this station seasoned remarkably fast. Fifty cedar poles, half of which were 30 feet and half 25 feet in length, were cut each month for one year and rafted about 90 miles down the Cape Fear River to Wilmington. About ten days were required to make this trip. During this time forty of the poles were in the water, while the remaining ten were skidded above the others out of reach of the water. Six hundred poles were delivered at this station. Since these had been cut in swamps it was impossible to obtain their first weight at the time of cutting. The following summary shows for the four stations the date of establishment and the number of poles at each:

Station.	Date started.	Wood.	Total poles.
Dover, N. J.	July, 1902	Chestnut	400
Thorndale, Pa.	May, 1903	Chestnut	600
Pisgah, N. C.	June, 1903	Chestnut	600
Wilmington, N. C.	Aug., 1903	Cedar	600
Total			2,200

(*To be continued.*)

Abstract from a Bulletin of the U. S. Forest Service.

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A General Outlook

THE EXTENSION SET.

EXTENSION set service is a leader. It is thought by many to be the first step toward luxury in telephone service, but in reality the installation of an auxiliary instrument is the surest means of impressing upon a subscriber the essential characteristics of telephone service which give it value. It reduces the loss of time and energy in communication to its lowest terms, and so drives home the impression of the absolute necessity of telephone service in the strongest possible manner.

Where a measured rate system of charging is enforced by the telephone company the extension set not only stimulates subscribers to a more extended use of the service, but becomes in every sense a revenue provider for the telephone company, as each additional instrument in a house or business establishment is bound to have a tendency to increase the rate of calling.

A NEW USE OF THE TELEPHONE.

RAILWAYS have made themselves responsible during the past few years for several very important classes of specialized telephone service. At the present time the offices and lines of most of the leading railways of the country are furnished with well developed systems, designed particularly to meet the special requirements of railway business.

The operation of these systems has fully overcome the earlier objections of railway men, who were opposed to the telephone on account of a fancied lack of reliability. Now the men controlling the railway telephone systems, and even the other operating officials, seem to be in some cases even enthusiastic about the telephone, and are seeking to extend its usefulness to new limits outside their own properties. A noteworthy example of this has been offered recently by the Pennsylvania Railway, which in certain cities where terminals of its lines are located has paid for the installation of telephones in the residences of its engineers and firemen. It proposes to abandon the old system of employing "callers," and depend wholly upon the telephone for communicating with its men when they are outside its yards.

SEASONING TELEPHONE POLES.

SEVERAL very practical lines of experiments, intended to furnish information which will enable users of wooden poles to adopt such precautions as are likely to insure the highest economy, have been taken up by the U. S. Forest Service. During the past three weeks some of the preliminary results of these experiments have been made available to the public by the issuing of three new bulletins. Reviews of two of these, dealing with the methods of preservation, will be found in other columns of this issue, and arrangements have been made to reprint the greater portion of the bulletin on seasoning poles.

The information included in these bulletins will no doubt lead many persons who have been watching for their appearance to undertake projects for increasing the life of the poles which they are about to use on a practical scale. There would no doubt be considerable advantage to pole users in general, and to the particular interests which adopt preservative measures, if careful records were taken covering all new work of this nature. There seems to be an inclination in some quarters to believe that because the Forest Service has taken up this subject the investigations are particularly difficult, and many telephone companies which would be interested are leaving the matter very thoroughly alone. As a matter of fact, the methods of determining what are now considered to be important factors which affect the life of a pole set in the ground are by no means difficult. In fact the bulletins of the Forest Service which have already been issued set forth the methods adopted in making experimental treatments and recording the data so closely that practically any telephone manager could acquire all the necessary information to enable him to conduct similar work by simply reading these bulletins. Neither are the experiments expensive, even when only the first cost is considered, and it should be taken into account that there is little doubt that the increased life of treated poles will more than pay for the labor and material expended.

When it comes to taking records, all that is necessary is to follow the system indicated by the Forest Service. In order that the records may be valuable, however, it is necessary that observations should be taken at regular intervals throughout a considerable period. This, of course, requires patience and persistence. It is bound to be some time before anything like final or definite figures covering the matters dealt with in the present bulletins can be obtained. In the mean time the existing supply of poles is bound to be drawn upon heavily, and the exact effect of the methods of preservation is bound to be more or less indeterminate.

Each general locality of the country has specific conditions which are bound to affect the working life of poles, and it would seem to be well worth while for those who have the necessary interest in the subject, and patience, to lay out a plan for keeping records showing the effect upon their poles of any preservative measures which are employed.

WORKMANSHIP.

POOR workmanship in the first place is responsible for a great deal larger percentage of maintenance expense on telephone apparatus than the actual wear and tear and the effects of storms. If a man scars a copper line wire when he makes a joint in summer, that joint is probably going to hold up and appear good until winter comes. Then the line contracts, the tension is increased and the wire breaks at the fault made by the careless use of tools. This accident may not come until there is a storm, when a dozen of these breaks are likely to occur at the same time in as many widely separated localities. Then is the time for getting out with the teams, and spending five dollars to repair every break, when it could have been done in the first place for about five cents. The man who left the wire in bad shape either knew he was doing so, or could have known it had he exercised ordinary care and observation, and he no doubt knew how to correct his fault in not more than five minutes' time.

The lineman is not the only person who makes errors of this sort. The instrument setter does the same thing, to say nothing of the central office installer. At the subscriber's station a ground wire may be run half way around the basement by some person who does this unnecessary work rather than move a pile of material which is stored in some place where it interferes with the putting up of the ground wire in a straight line. The result of such a performance, which is by no means an infrequent occurrence, may be very serious, or may involve only a trip to repair a burnt coil. Still, the ultimate expense for repairs is altogether out of proportion to the cost of doing the work correctly in the first place. It is always to be remembered that when work is left over to be done at a future date one must add to the actual cost of labor a very much larger sum for transportation and time traveling.

Two of the principal problems any telephone manager has to meet are those of educating his subordinates up to a point where they will recognize the ordinary standards of workmanship, and then still further to the place where he can count upon their observing these standards in their daily work. The two things that the average employee thinks are of prime importance are methods of getting ahead in knowledge of the business, and increasing his salary. If such a man will only put forth his best efforts to accomplish the results desired by the manager in this matter of workmanship, there is little doubt that he will incidentally accomplish his own ends without worrying about the means. A plant where every man does first class work all the time would probably be about the hardest thing in the world to find, but if any one ever got there he would discover his maintenance expenses to be so low that he would not have to hunt for money to pay salaries or dividends.

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Legal Answers and Decisions

CONDUCTED BY A. H. McMILLAN.

OWNERSHIP OF SWITCHBOARD IN MUTUAL COMPANY.

We have a large mutual company chartered under the laws of Kansas. Its constitution is the one given out by one of the telephone manufacturing companies, "Mutual Plan." It consists of several divisions, each having several local lines running into one switchboard.

Now, if a division should wish to withdraw from the general company, can it hold its central and switchboard property? Also, if a number of lines should wish to withdraw, could the local organization hold their lines? Or could the general organization hold the property in either case?

S. N. C.

THE company referred to in the above query consists of a number of district organizations and local organizations. The constitution provides that "a district organization shall consist of individual subscribers, and local organizations uniting in same switchboard; an individual subscriber shall consist of a person owning an individual wire branching from a district switchboard. A local organization shall consist of three or more subscribers uniting in the use of a single wire branching from a district switchboard." The by-laws provide as follows:

"Each district organization shall erect, maintain, own and control its own switchboard.

"Each local organization shall erect, maintain, own and control its own line and telephone, and in a way be separate and distinct from the other organizations of this company.

"Each individual subscriber shall erect, maintain, own and control his own line and telephone and be governed by his district organization.

"A local organization forming and building one or more lines shall first get the approval of the proper officers of the general organization."

The penalty provided for not keeping lines and telephones in good repair is the disconnection of the local organization or its members from service.

Under this arrangement, we see no reason why a district organization or division may not withdraw from the general organization, and in case of its withdrawal, we think that it would still hold and own its central and switchboard property. If a number of lines should wish to withdraw, we do not think the local organization could hold the lines thus withdrawing, but the local organization would still hold its switchboard property, and could disconnect from its switchboard any line or individual subscriber who did withdraw. The general organization could not hold the property in either case. This seems to be the legal result from the articles providing that the district organization shall own its own switchboard, and that each local organization and each individual subscriber shall own its or his own line.

INJURY FROM FALLING INSULATOR.

THE Supreme Court of Massachusetts has affirmed a judgment for the plaintiff in the case of McNicholas vs. New England Telegraph & Telephone Company, holding that the question of defendant's negligence was properly left to the jury. The case arose out of an accident to a boy, seven years old, who was standing in the middle of the street when a piece of something like marble, falling from above, struck him in the forehead. A man was working on the wires of the pole about 12 or 15 feet away. The pole was owned by the Boston Electric Light Company, but carried 14 wires of the defendant. The plaintiff was unable to point out the exact way in which the accident happened, but showed that the lineman was an employee by circumstantial evidence consisting of the defendant's ownership of the wires, the presence of a wagon bearing the name of defendants during the time the lineman was working on the pole, and the actions of the lineman after the accident, which were in accordance with the instructions given employees of the company by their foreman to follow in case of accident. The court therefore held that it might well have been found by the jury that a piece of porcelain insulator was dropped by the lineman in the course of his employment.

Testimony of the boy's mother, that a man, who came to the house after the accident, produced from his pocket a piece of something like white marble, saying: "Do not worry; it is nothing to be worried about blood poisoning, for this is the kind that hit him," was held admissible. The ground for its admission was that the statement was not a narrative of a past event, nor the admission of liability, but within the scope and exercise of his employment. McNicholas vs. New England Telephone & Telegraph Company, Supreme Court of Mass., June 20, 1907. See Massachusetts Reports and N. E. Reporter.

RAISING FRANCHISE RATES.

Would you kindly tell me through the columns of your paper if the City Council in a town of 1,500 to 2,000 people can prevent a telephone company from raising its rates when the rates are specified in the franchise. This is in Indian Territory, but we are under the Arkansas law. F. McG.

IF the City Council has power to fix the rates of the franchise, it can prevent the company from raising them, even though the company is incorporated under the laws of the adjoining State. It would therefore make no difference whether you are under the Arkansas laws or not. The law that would govern in determining this question would be the law of Indian Territory. It is generally held that a city has no authority to regulate rates. State, ex rel. Garner vs. Missouri & Kansas Telephone Company, 88 S. W., 131. The power to "control the use of streets" and "license, tax and regulate" telephone companies does not confer authority to regulate rates. Joyce on Electric Law, Section 525.

BUILDING MOVERS ENJOINED.

AT Paw Paw, Mich., an injunction was issued by the Circuit Court restraining Frank Lanphear and H. B. Hoagland from moving a barn upon the streets of Paw Paw, so as to interfere with the poles and wires of the company, unless the company was notified in proper time, and security filed with it for the expense it would be put to in moving and replacing its wires. It is the contention of the company that it is not obliged to move or cut its wires in order to allow the passage of a building unless the owner or mover shall either pay for the probable expense in advance or file with the company a proper guarantee to reimburse the company for such expense as it shall be put to in changing and repairing the wires. It further avers that to compel it to so change and repair the wires and replace the poles at its own expense under such circumstances would be the taking of private property without due process of law, and would be in conflict with the constitution of the State of Michigan and the 14th amendment of the constitution of the United States.

NO DAMAGES AGAINST COMPANY FOR REFUSING TO INSTALL TELEPHONE FOR DELINQUENT SUBSCRIBER.

A JURY in the United States Circuit Court at Memphis, Tenn., returned a verdict in favor of the Cumberland Telephone & Telegraph Company, which was defendant in a suit brought by John C. Walsh for ten thousand dollars. The plaintiff claimed this amount because the company refused to put in a telephone when he applied for one. The company's side of the case was that Walsh refused to pay certain telephone tolls debited against him, and for this reason the instrument was removed from his residence, and was never put back, although he applied for it on numerous subsequent dates. He alleged in his declaration that his instrument was on what is known as a "party line," and that one of the other subscribers was responsible for the long distance tolls and not he, and that he was not aware of the calls having been given.

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Development and Operation

FARMERS WAITING FOR GOVERNMENT TELEPHONE LINES IN MANITOBA.

L. BELCOURT, of the Bell Telephone Co., addressed some twenty farmers in Robertson's Hall, Elgin, Manitoba, on the night of June 28, and explained what the company had advertised as the best proposition ever made as regards the telephone question. As the farmers of the municipality have made many requests for a telephone system, Mr. Belcourt, no doubt, thought it was about time to get the farmers switched in favor of the Bell system and used all his eloquence to that end, but with no apparent result. He told the meeting that many farmers in Eastern Ontario, Quebec and the United States had adopted the plan, but it was a new one to Manitoba. He proposed that a club of five or fifteen farmers should construct and maintain their own line and the Bell company would give them switching connections with the Elgin exchange for $3 per telephone per year. Should the farmers wish to use the Bell poles the company would string wires at $8 per mile. Thus, if they ran six miles and had ten farmers on the line the cost to each would be $4 plus the $3 switching rate. Mr. Belcourt then recommended the farmers to build their own lines and the estimate costs he quoted were considerably less than what the Bell company stated last year it would cost them to build.

One farmer asked Mr. Belcourt a question which showed up the company's object. He stated that he had signed for a telephone two years ago and the line had come to within a mile of his farm. He wanted connection and asked what the company would charge to make the connection and he was told $25. The meeting then broke up and it is understood steps are now being taken to form an Independent rural company, to connect with the government lines for long distance service.

NEW PLANT FOR RUSHVILLE, INDIANA.

CONDUITS are now being laid at Rushville, Ind., for the cables of the Rushville Coöperative Telephone Company. A new building has been completed for the central office, and everything is ready for the installation of equipment. It is expected that the system will be completed by October 1, after which the people will have an up-to-date Independent telephone service.

ARRANGEMENTS FOR ACCOMMODATIONS AT THE CONVENTION OF MUNICIPAL ELECTRICIANS.

FRANK B. FOSTER, secretary of the International Association of Municipal Electricians, has announced that the people of Norfolk, and the management of the Jamestown Exposition, are making preparations for making the twelfth annual convention of the association a most enjoyable one. It will be held at Norfolk on August 7th, 8th and 9th. Mr. Foster has sent out from his office at Corning, N. Y., a list of hotels and rates, and suggests that Mr. R. A. Smith, city electrician, Norfolk, Va., will act as agent for persons in securing rooms in advance, or will furnish any special information about this matter which is desired. The secretary of the association will be at the city hall in the afternoon and evening of August 6th, to allow those who arrive early to register and secure their badge, so that the proceedings will start off on time on the day scheduled.

BEAVER VALLEY, IN WESTERN PENNSYLVANIA, WHOLLY OCCUPIED BY INDEPENDENT TELEPHONE SYSTEM.

FOR more than a year, the city of Rochester, Pa., where the Big Beaver River empties into the Ohio, has been the final battle ground in the fight carried on by the Beaver County Independent Telephone Company, it being indispensable on account of connecting facilities.

Up to the recent Spring election, the Council was overwhelmingly loyal to the Bell company; but the four new members then elected changed the situation very materially, and, after continuous agitation, petitioning, argument and public demand, the Council passed a franchise, but the Burgess promptly vetoed it.

This veto message, to one familiar with the facts, is a beautifully curious piece of workmanship. Notwithstanding this, however, the franchise was again presented, again passed by decisive vote, and on July 15th, 1907, became a law by default of the Burgess, who, on "account of extreme heat," had become "indisposed."

The new office building of the Beaver County Telephone Company will now be located in Rochester, according to the original plan, and we have been pushing the work in other towns just the same as though nothing was in the way.

The conduit work is all finished in Beaver Falls and New Brighton, and well along in Beaver. Cable is all strung in the two first-named cities; several hundred poles set; linemen at work; new building in Beaver Falls, up to second story, in which the equipment will be installed about Sept. 1st, and before next January this whole valley will be enjoying an up-to-date Independent telephone system service.

OHIO COMPANY DECLARES FOUR PER CENT. DIVIDEND ON PLANT RECENTLY RECONSTRUCTED.

DIRECTORS of the Tuscarawas County Telephone Company, which has its headquarters at New Philadelphia, O., declared a four per cent. dividend on the common stock at the quarterly meeting held on July 16th. Readers of AMERICAN TELEPHONE JOURNAL will recall the description of the extensive reconstruction work which has been carried on in this plant within the past two years. To bring the system up to the present state of high efficiency, the expenditure of large sums of money was necessary, and in consideration of this fact the payment of the present dividend is considered to be an exceptionally good record.

The company at present has a plant which is considered by telephone men to be one of the very best in the State of Ohio, and its excellent physical condition is one of the reasons for the good return which it is making on the investment. Under the direction of J. K. Johnston, general manager, a most satisfactory service is being given, as is indicated by the very healthy growth experienced, with expenses for operation and maintenance which are said to be very low in comparison to the proportionate costs before the rebuilding of the plant.

"Look for the Shield."

MANAGERS, TAKE NOTICE.

The International Independent Telephone Association, through its Publicity Department, stands ready to furnish customers reading notices covering any phase of the operating field, whether to defend or **boost the telephone business,** increase rates, show cost of plants, or on any other subject, **free of charge** on application. Write to-day, stating your wants. Make use of the Publicity Department.

INTERNATIONAL INDEPENDENT TELEPHONE ASS'N,
Electric Building, Cleveland, Ohio,
Until further notice as to address.

Reproduction of an official bulletin which has been furnished to telephone manufacturers and others to attach to correspondence.

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Development and Operation

TELEPHONING NEWS REPORTS.

By Wm. A. Wadsworth.

NEWSPAPERS are to-day using long distance telephone lines for the purpose of transmitting news reports by telephone in preference to telegraph, in several important localities. There is a paper in Western New York which depends entirely on the telephone for its news service, believing that it is much more satisfactory and expedient and can be handled at a less cost than the old method of telegraphing tolls. The Associated Press in Buffalo is a sending point for this news which is transmitted 70 miles away and is received by a shorthand writer who confines himself to a certain period in the day in which this news is received, taking it down in shorthand and running it off on the typewriter in the press room.

The amount of money that is saved in this class of service is apparent. The method employed now by the Press Association and newspapers around the country is such that it requires not only the complete use of the telegraph line but a high priced telegraph operator for sending and receiving purposes, as well as paying for the news service. This very evidently brings the news service up to a great cost, whereas the other method, employing the telephone, is such that any employee of the newspaper establishment who is a shorthand writer can take the news accurately.

There is no doubt, however, that there is vast room for improvement before this method is brought up to a standard approaching perfection. It behooves somebody to find a sensitive record, so that instead of employing a stenographer to receive this news, the receiver will be placed close to the phonograph record, transmitted and the records put on a recording machine. Newspapers are realizing the fact that in these times methods must be employed for handling the news service more quickly than is possible by telegraph.

INCREASE OF BELL RATES IN WISCONSIN CAUSES REMOVAL OF TELEPHONES.

AT Kaukauna, Wis., the Bell company, after installing a new system, announced its intention of raising its rates on August 1st, using the well worn arguments relating to metaliic line service. The citizens were informed that the cost of their residence telephones would be practically doubled, and rates for business houses would be greatly increased. Immediately there was a storm of protest, and organized bodies have taken the matter up and stated their objections in detail to the company. The citizens have instructed their committees to encourage the Fox River Valley Telephone Company, which operates Independent systems in neighboring cities, to build an exchange at Kaukauna.

SUBLICENSEE COMPANY TO BE INVESTIGATED BY INDIANA CITY COUNCIL.

BLUFFTON, Indiana, has decided that the service given by the United Telephone Company, which some time ago passed under the control of the Central Union (Bell) organization, is not satisfactory. An ordinance has just been passed by the city council providing that a committee be appointed to investigate the service, rates and equipment of the plant, and report whether the company is giving to the citizens the service its franchise calls for. The ordinance also provides that after the investigation the city shall reserve the right to take over the telephone system as a municipal concern, giving an equitable recompense to the company. It is further provided that if the telephone company does not afford the necessary facilities for pursuing this investigation the city shall revoke its franchise and permit the entrance of an Independent system.

It is claimed that a feeling of dissatisfaction has existed ever since the United Telephone Company became connected with the Bell lines. A similar condition of dissatisfaction after the acquiring of an Independent company by foreign interests is reported from Linton, where Dr. Ammerman has secured an order from the court compelling the company to install a telephone which was removed on account of his refusal to sign a contract to patronize the company for one year, after the instrument had been disconnected during his absence for three months. It is said that the company has not obeyed the order, and continued litigation is expected. In the meantime the people of the city are extending little sympathy to the telephone company, claiming that it has adopted a high-handed, arbitrary method of dealing with its subscribers since forming its new connection.

INTERNATIONAL ASSOCIATION OFFERING LOW PRICES ON SHIELD SPECIALTIES.

BULLETINS of The International Independent Telephone Association, mailed from the present headquarters at Cleveland, O., give especially low rates for the purpose of closing out the small stock of shield specialties which is still on hand. The prices show substantial discounts, and telephone companies are thus given an opportunity for a short time to obtain this valuable advertising material at a particularly low cost. Inquiries should be mailed at once to the association.

OHIO INDEPENDENTS TO MEET AT COLUMBUS ON AUGUST 6TH.

MEMBERS of the Ohio Independent Telephone Association will hold a special meeting on August 6th, as announced in last week's issue of American Telephone Journal. Important matters are to be discussed at this meeting, and a good attendance is expected. As the primary purpose of this meeting is to discuss the general telephone situation of the State, it is important that as many operating men as can possibly do so should be on hand. The meeting is to be held at the Southern Hotel, Columbus, O., at 10:30 A. M.

DENVER INDEPENDENT COMPANY WILL TRY FOR NEW FRANCHISE.

SINCE the decision of the court that the franchise granted to the Independent Telephone Company of Denver was illegal, on account of a technical defect in the method of submitting the question to the people, who declared in favor of it, plans have been made for obtaining a new franchise at the earliest possible date. Within a short time, it is reported that a measure will be introduced into the city council intended to give the Independent company a permit to operate similar to that possessed by the Colorado (Bell) Telephone Company. It is asserted that if this fails to pass, steps will be taken to force the Bell interests to apply for a franchise at a regular election. In this event the Independent company will again apply for a franchise, and continue to do so, if necessary, until one is granted. The people of Denver declared their approval of Independent telephone service, and the company intends to keep up the fight until it gives it to them.

REFUSING SERVICE BECAUSE RATES DO NOT PERMIT IT.

AT Lebanon, Ky., a suit has been filed in the Circuit Court by the Lebanon Grocery Company against the Lebanon, Louisville, & Lexington Telephone Company for a mandatory order compelling the telephone company to furnish service and paying for a judgment of $2,000.

When the Lebanon Grocery Company, a wholesale house, opened for business, it applied to the telephone company for service, which was refused. All efforts by this house to get telephone services, it is alleged, have been fruitless, as the telephone company claims that it cannot do a profitable business with more patrons at the present rates. It is admitted by the telephone company that this policy was adopted to get the matter in such a condition that it can raise the present rate or abandon the Lebanon exchange.

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Methods and Formulae

FIRE ALARM SYSTEM FOR SMALL TOWNS.—(891.)

Do you know of a simple form of fire alarm? In this small town the fire department men live in their own homes. I have now about fifteen series bells—80 ohms—with hand generators at convenient points to give the alarm.

This is not satisfactory, at least to me. The authorities are not considering making the number up to fifty. Would this be too many to use on a bridged line? I would put in telephones where the hand generators now are. If this is practical what resistance should the bell coils be? What overload would this stand and talking and ringing continue good?

F. H. B.

The most important features of fire alarm apparatus are simplicity and durability. Therefore, it is always desirable to build the equipment as strong and with as few parts as possible. There are, we believe, many ways of getting the results which you desire, which would vary a great deal in cost. We have selected two plans which appeal to us as about fitting your conditions. We would ask, however, that you advise us more definitely as to your local conditions if these plans do not meet with your approval.

Fig. 891a shows a single pair of wires, over which both the alarm stations and firemen's call are worked. The central station equipment consists of a regular jack and 80 ohm drop, a single ringing key and three cells of closed circuit batteries. A battery bell may be substituted for the drop if it is desirable, and it probably would be, as you would be less likely to get false alarms. The alarm equipment consists of a transmitter, receiver, induction coil and switch. This would be the ordinary local battery apparatus. The best form for this would be a combination transmitter and receiver, with the switch in the handle; as in the excitement of a fire a man would not be likely to hang up his receiver. Another way would be to put spring hinges on the door of the alarm box, and make the door close a contact in place of a switch when it was opened. If this were used a man would hold the door open while talking, and it would close itself when he left. There is practically no limit to the number of stations which may be placed on a line of this nature, as one in no way affects the others, and no current is used except while the telephones are in use. The only limit would be the length of the line, and this may be overcome by adding additional battery.

The firemen's call equipment consists of a 1600 ohm ringer and a 2-Microfarad condenser. We presume that you do not care to have the firemen answer back, but if you do an ordinary bridging telephone may be substituted for the apparatus by

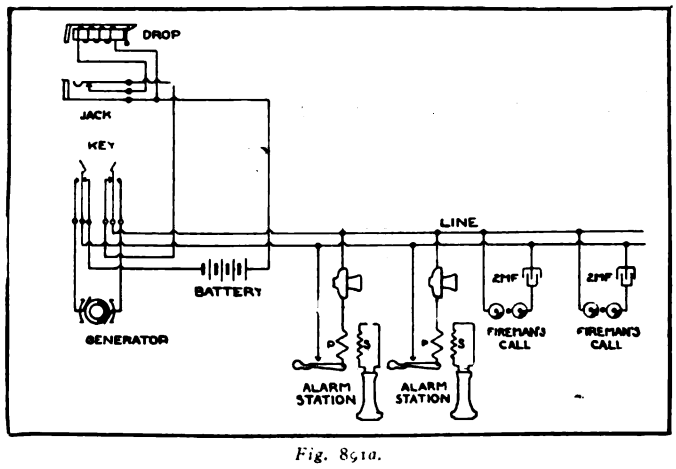

Fig. 891a.

cutting a condenser in series with the ringer. The plan of operation is as follows:

The person desiring to turn in an alarm of fire opens the door of the alarm station box and calls central, by either opening the door or pressing a spring in the handle of the telephone, as the case may be, which immediately connects him with the central office. He then tells the operator the number of the box from which he is talking. This number should be printed very plainly on both the inside and outside of the box, in order that there may be no mistake. The operator then pulls the ringing key, calling all of the firemen on the line. A code ring may be arranged by which she can give the number of the box, as in many cases the fireman may be much nearer to the fire than he is to the fire house. The number of firemen's call boxes is limited only to the output of your switchboard generator.

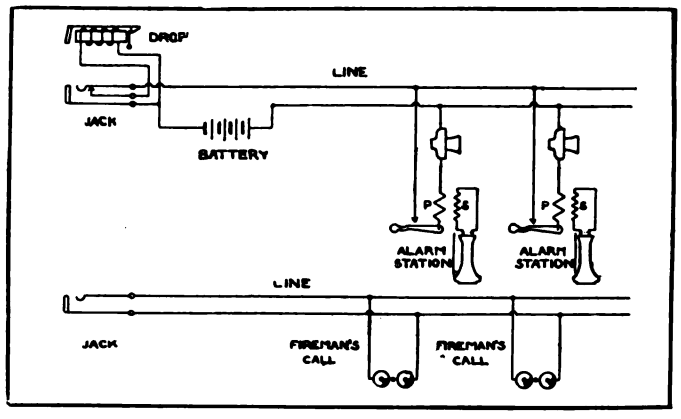

Fig. 891b.

Fig. 891b shows a plan which is the more simple of the two, and much to be preferred, the only objection being in the cost of additional line for the firemen's call boxes; but the gain in simplicity and efficiency will probably counteract this expense. The alarm station is the same as in the plan shown in Fig. 891a. the operator answering the same as she does in any call. After she has found out the number of the box she removes her plug from the alarm station line, and inserts it in the firemen's call line and rings them with her regular ringing key. This plan does away with the condenser in the telephone, and also allows more ringers to be put on the line for the size of the generator. As you are in a small town, and fires are not very numerous, it would be advisable to make a test on your line daily, or as often as convenient. This can be done by ringing out on the line and ascertaining as to whether all of the firemen's call stations ring correctly or not. It would be well also to have your inspector test out each alarm station by calling central from it at frequent intervals. There is nothing like plenty of testing to keep a system in good order.

COMPOSITION OF SOLDERING STICK.—(892.)

Will you please send me a formula for a soldering stick or paste, or publish one in an early issue of THE AMERICAN TELEPHONE JOURNAL?

A. B. S.

The following formula, we believe, you will find perfectly satisfactory, as it gives a good surface upon which the solder will take, and upon which it will hold very securely.

In a stone jar, having straight sides, pour one and one-half pints of muriatic acid; to this add as much zinc as you think will combine with it, and immediately light the gas which will be given off during the process of combination. Keep this gas burning as long as it exists, after which allow the solution to cool and filter it to remove the remaining zinc. To this solution add 1 oz. of sal ammoniac and stir until dissolved. Then make a combination of 1½ lbs. of olive oil, 1½ lbs. of tallow and 12 ozs. of pulverized rosin. Mix them well and boil them. When the mixture is just about cool add the acid mixture and stir the entire solution until it becomes stiff, at which time you will have secured a most reliable soldering stick or paste. We would caution you, however, against the danger of spilling this mixture on your clothing, as it will burn holes in cloth very quickly. It will be be well also to avoid getting the acid mixture on one's hands, while it is in the liquid state, as it is liable to burn and cause some discomfort.

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SECOND-HAND switchboards for sale—2 100 capacity Chicago Telephone Supply Co.; 1 200 capacity and 1 100 capacity Western Telephone Construction; 1 100 capacity Swedish-American; 2 50 capacity and 2 100 capacity Eureka; 1 100 capacity Standard; 3 100 capacity Keystone; 3 200 capacity and 1 100 capacity North. Address Victor Telephone Works, 6583 State St., Chicago, Ill. 817

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

TENDERS WANTED—Sealed tenders, addressed to the undersigned and marked "Tenders for Subway," will be received up to noon of Wednesday, the 31st day of July, 1907, for the building of such subway as will be required in the Manitoba Government's telephone system in the city of Winnipeg. Plans and specifications may be seen at the office of the Railway Commissioner, Government Buildings, Winnipeg. An accepted check of an amount equal to five per cent of the tender must accompany same. The lowest or any tender not necessarily accepted. J. H. Howden, Minister of Railways, Telephones and Telegraphs, Winnipeg, Man. 880

WANTED—Chief operator to take entire charge of exchange having 2,500 subscribers; none but those capable of commanding the respect of operators need apply. State salary, experience and success obtained. Address Box 878, care AMERICAN TELEPHONE JOURNAL, New York. 878

POSITION—By young married man with ten years' experience as superintendent or manager. Thoroughly competent construction man and executive. Will guarantee results. Any locality suitable. Address Box 879, care AMERICAN TELEPHONE JOURNAL. New York. 879

COMPETENT man wishes position as telephone auditor or accountant, capable of going ahead with office detail or installing system, latest ideas, best of references. Address, Box 856, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 856

POSITION WANTED—Young man, 24, three years' experience in installation of P. B. X. switchboard, intercommunicating systems and interested in the trade; salary $21. Address Box 870, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 870

WANTED—Position with telephone company as maintenance or instrument man. Five years' experience. Best of reference. Address Box 867, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 867

WANTED---Continued

WANTED—Position as wire chief or local manager in Middle West. Graduate of an electrical school; four years' experience as wire chief and switchboard repair man in central energy systems. Address Box 869, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 869

WANTED—Position as manager, contract agent or high class solicitor in the independent field by a thoroughly competent telephone man with twelve years' practical experience. Familiar with magneto and common battery systems. Now holding position as manager of three exchanges for an extensive independent concern. In present position two years. Salary to start $100 per month. Address, Box 874, care AMERICAN TELEPHONE JOURNAL, 100 William Street New York. 874

WANTED—Young men who are high school graduates and who have had one or two years' experience in telephone work, to enter our manual switchboard department and learn to wire toll boards, wire chief's desks, private branch exchanges, etc., for use in connection with our automatic systems. Call or write, Automatic Electric Company, Van Buren and Morgan Sts., Chicago, Ill. 868

SALESMAN—Wanted for Atlantic Coast States to sell Telephone Apparatus and Supplies. Must have selling experience, be familiar with exchange work and able to get business and hold it. State age, experience and references. Address Box 876, care AMERICAN TELEPHONE JOURNAL, New York. 876

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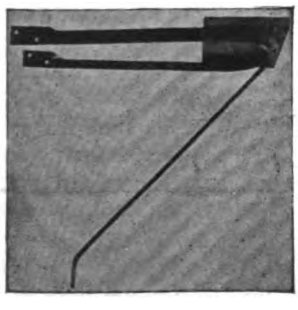

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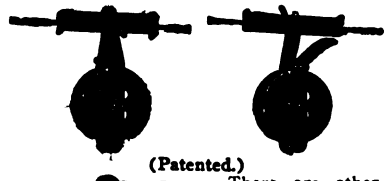

(Patented.)

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Because they never jam or stick on the cable.

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SECURITY MARLINE CABLE HANGERS ARE CHEAPEST.

All you need know is that marline makes the best cable hanger if it be *good* marline—and Security Marline is the *best* Marline.
See Bulletin Number Three also.

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Patents and Patentees

AUTOMATIC TELEPHONE SYSTEM.

N. E. Norstrom, Junction City, Kan., patent 857,959, June 25, 1907; one-half assigned to John Anderson, Salina, Kan., and one-sixth to M. E. Richardson, Sterling, Kan.

The system described in this patent comprises one of the step by step lockout selective systems in which each instrument is provided with an index or keyboard for selecting the instrument desired. The operation of the instrument is accomplished by the subscriber turning a generator crank which controls the current generating device operating a relay in such manner as to cause a step by step selector to be actuated.

AUTOMATIC TELEPHONE SWITCH.

J. Wicks and D. D. McKay, Riverside, Cal., patent 852,004, April 30, 1907.

The features described in this patent relate to improvements in automatic selecting mechanism for use in connection with systems of the Strowger type, the salient feature being a method of automatically selecting mechanism which will connect ringing current generators to the different line wires of a party line so that the different instruments on the line may be selectively called independently of each other.

SELECTIVE LOCKOUT SYSTEM.

N. E. Norstrom, Chicago, patent 852,575, May 7, 1907; assigned to J. Anderson, Salina, Kan.; M. E. Richardson, Sterling, Kan.; J. H. Martin and H. Keating.

In this patent is described a form of selective lockout system embodying in its construction three relays, together with cog-wheel attachments and switches. The switching mechanism is supported on a frame directly beneath the generator box in such a manner as to utilize the magnetic force of the generator magnets to polarize the armatures of the relay magnets.

SIGNALING KEY.

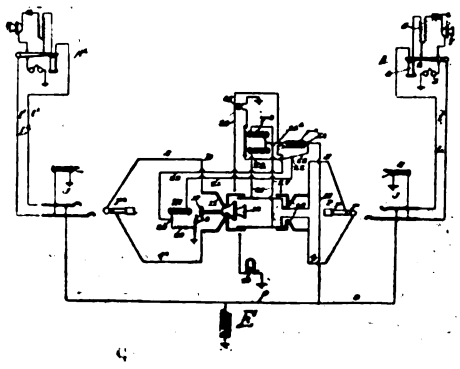
O. F. Forsberg and J. A. Birsfield, Chicago, patent 855,168, May 28, 1907, and assigned to W. E. Co.

The key described in this patent consists of a combination of springs, wheels and notched strips, arranged in such a way that by setting the indicating dial, the key is caused to be operated in such a manner as to open or close the generator circuit any desired number of times, thus allowing of the ringing of the telephones by a predetermined code.

TELEPHONE SYSTEM.

H. P. Clausen, Chicago, patent 859,201, July 9, 1907, and assigned to American Elect. Tel. Co.

In this patent is described a telephone system in which is provided means for automatically governing the connection of the ringing current generator to the line for the purpose of signaling the called for subscriber.

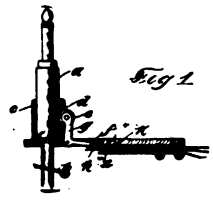


Upon depression of the ringing key 12, which closes connection between spring 18 and contact point 20, a path is provided for current from battery *E* through magnet *m*. This magnet being energized thereby attracts armature 17 and holds the ring key 12 in an operative position, thus causing a continuous ringing connection with the line of the desired subscriber. This attraction in the magnet *m* is broken either by the answering of the called for subscriber or the replacing of the calling subscriber's receiver upon its hook, a complete metallic circuit of lower impedance being provided through the relay r^3. Thus diverting the major portion of the current from the magnet *m* and leaving it with not sufficient power to still hold the armature 17 and ringing key 12.

PLUG SEAT SWITCH.

E. E. Yaxley, Chicago, Ill., patent 860,070, July 16, 1907.

The device described in this patent comprises a switch whose action is dependent upon the position of the switch board plug.



In the retaining shell *c* is provided a bell crank lever *g*, which carries the cylindrical rollers *e* and *f*.

The removal or dropping into place of the plug *a* causes a change in position of the roller *e* and the crank *g*, so that pressure is exerted or relieved on the spring *h*, thus allowing an auxiliary circuit to be opened or closed as desired.

SELECTIVE SWITCHBOARD KEY.

A. M. Haubrich, Chicago, patent 857,621, June 25, 1907, assigned to S. C. Telo. Mfg. Co., Rochester, N. Y.

The key described in this patent constitutes an improvement over application No. 208,685, filed May 19, 1904, by M. S. Conner, and is so constructed as to allow the returning of each of the selective buttons to their normal positions upon the withdrawal of the calling plug from the switchboard jack, the improvement consisting in this feature, as the key described in Mr. Conner's application provides that each key shall upon actuation remain slightly depressed until some other key of the selective set is depressed, at which time it is released, in order that the operator may distinguish between the various buttons in case it is necessary to operate the same key several different times.

DESK TELEPHONE MECHANISM.

A. K. Andriano, San Francisco, Cal., patent 853,855, May 14, 1907, assigned to Direct-Line Gen. Tel. Co.

The invention described in this patent consists of a telephone so constructed as to fit into a pigeon hole of an office desk, and comprises a transmitter, together with a switch hook extending outwardly from the top of the transmitter for the reception of the receiver. The object of the invention is to supply a telephone that will occupy but little room, and in which the receiver and transmitter will rest, when out of service, so as to mutually protect their diaphragms when the receiver is on the hook.

MAGNETO TELEPHONE SYSTEM.

L. B. Niemann, Staplehurst, Neb., patent 857,480, June 18, 1907.

The novel feature of this system consists in the installation at the switchboard of an additional drop in the cord circuit in series with the line and ground, the object of this drop being to provide, in systems using the "ring central ground, subscribers metallic" system, a means whereby the subscriber may positively signal the operator in case the clearing out drop does not operate upon the actuation of the magneto generator of the local instrument. This additional drop, the inventor states, must be so constructed and of such resistance as to require a minimum amount of current for its actuation in order to insure its operation at all times.

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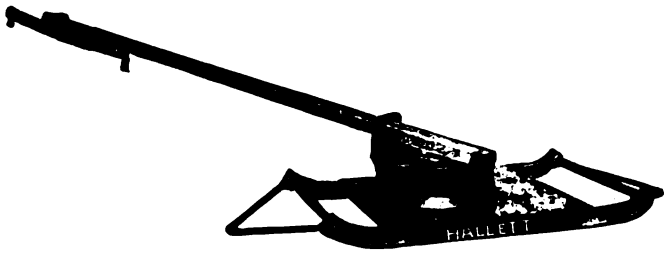
Sumter, S. C.



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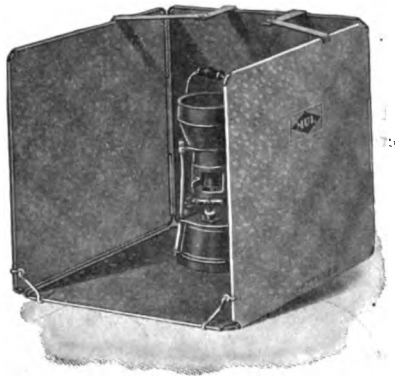

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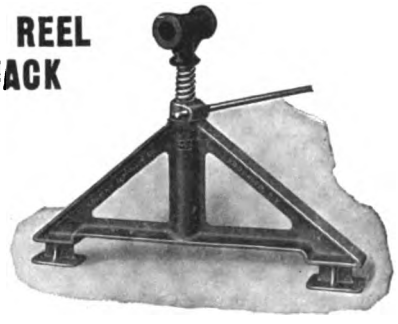

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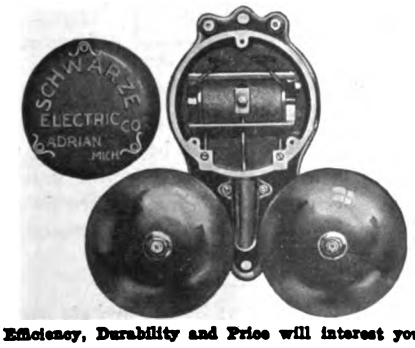

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From Shops and Factories

BELLS FOR THE STROMBERG-CARLSON HARMONIC SYSTEM.

A RINGER which has comparatively few parts, and these of a massive character, is one of the essential features of the new harmonic selective system which has been developed by the engineers of the Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y. It is used in connection with a harmonic party line system which the company states will operate equally well on harmonic ringing currents produced by a harmonic converter or a multi-cycle motor generator set. Four tuned bells bridged across the line can be rung selectively with no interference or cross ringing, it is claimed. The system employs no grounds or three-wire connections and the instruments can be attached to the circuit individually or in complete sets of four without reference to the tip or sleeve of the line.

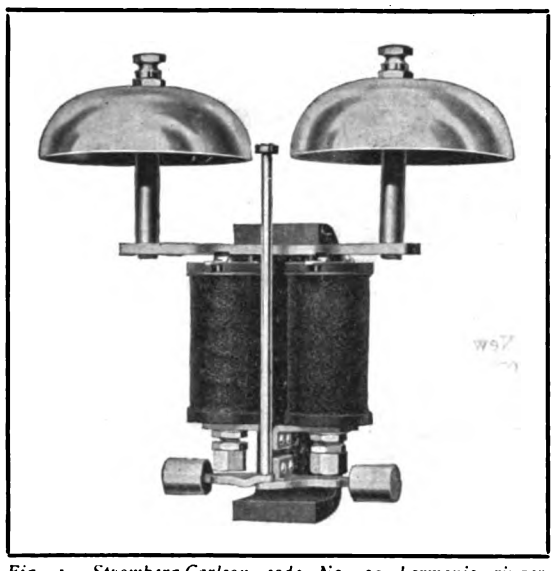

Fig. 1.—Stromberg-Carlson code No. 32 harmonic ringer, assembled.

The type of harmonic ringer used is illustrated in Figures 1 and 2. It will be noticed that the fixed parts are substantially constructed and rigidly assembled. The weights are permanently fastened on the ends of the armature plates between which is riveted the spring steel reed of the proper relative tensile strength. Every armature is tuned to respond exactly to the frequency for which it is assembled, and any variation in the gauge of the material used for these reeds is overcome by grinding out some of the material, making the reed vibrate with the exact frequency for which it is designed.

The design of this ringer is such that a complete disassembly of all parts may be effected by taking out the complete armature and the ringer spools. The adjustable feature of the air gap between the armature and armature stops is simple and rigidly assembled. The apposite end of the spool core is made to fit in the slots of the mounting plate of the ringer to avoid any possible twisting or working loose of these parts. The gong posts are also riveted permanently to the mounting plate and the adjustment of the gongs obtained by having them drilled slightly off center. To prevent the gongs from becoming loose, due to the vigorous vibration of the tapper rod, a check nut is furnished with the thumb screw folr holding the gongs. The entire construction is designed to secure all necessary rigidity.

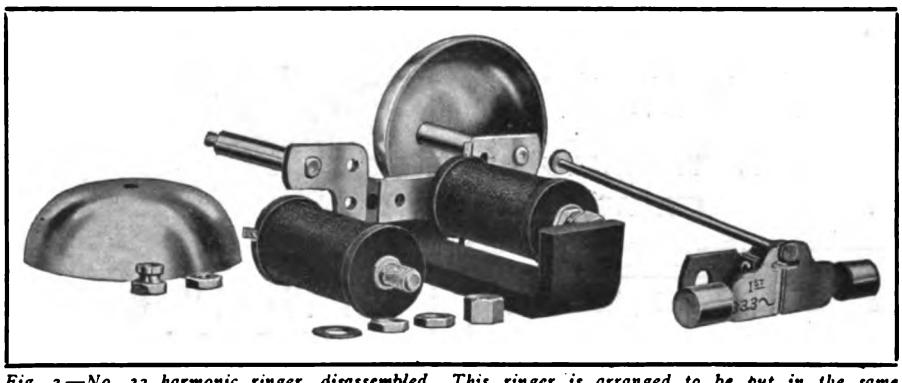

Fig. 2.—No. 32 harmonic ringer, disassembled. This ringer is arranged to be put in the same space occupied by regular line ringer, a combination of drilling in the mounting plate making it interchangeable.

The Stromberg-Carlson company developed these ringers after a series of experiments and study, which resulted in producing an article which it considers satisfactory for any kind of four-party selective harmonic ringing systems. Some 15,000 of these ringers are now said to be giving perfect service with apparently no depreciation of parts, due to the careful construction that was embodied in this form of ringer from the beginning.

In these illustrations is shown the 33.3 cycle ringer, which is usually selected by operating companies as the first party ringer. The other low frequency ringer of this set is equipped with weights a trifle larger in size, whereas the two high frequency ringers do not employ weights at all. These ringers can be readily placed in any of the various forms of telephones that the Stromberg-Carlson Company manufactures, and are being used in central energy instruments of other forms. Complete information will be cheerfully furnished by the company.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, New York, reports that it has recently closed a contract with the Union Telephone Company for a common battery multiple switchboard equipment for Charleroi, Pa., 2,000 capacity with 600 installed, arranged for four-party selective ringing with individual selective key on each cord circuit; also 600 instruments.

The Century Company also recently closed a contract with the Hornellsville Telephone Company, Hornell, New York, for a common battery multiple board, with a present equipment for 800 lines, ultimate capacity 2,400 lines.

W. C. STERLING & SON CO. received a very complimentary notice in the newspapers of the city of Monroe, Mich., a short time ago when they announced the establishment of a pole yard in the city. These yards were established in order to provide certain improvements in shipping facilities and are supplementary to the main yards at Bay City, where a very large stock is constantly kept on hand.

In addition to the new yard at Monroe, where the company expects to keep on hand on an average of twenty or thirty thousand poles, the Sterling company and other firms in which it has a controlling interest will have large yards at Boyne Falls, West Branch, Cass City and Pinconning, with smaller ones scattered through the northern portion of the State. The attention of readers of THE AMERICAN TELEPHONE JOURNAL has before this been directed to the large holdings of this company in timber lands, the extent of which not only enables it at the present time to furnish goods of required quality promptly, but insures the continuance of its ability to satisfy purchasers for years to come.

ELECTRIC GOODS MFG. COMPANY, 115 Purchase street, Boston, Mass., has just issued an attractive folder advertising the Sampson battery, favorably known for open circuit work, and several interesting types of telephones for intercommunicating service.

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An Unusual Investment Opportunity

A System of Rapid Automatic Telegraphy that transmits messages at the rate of 50 words for 25 cents, anywhere in the United States.

...The...

TELEPOST

An Independent Telegraph Corporation, to be operated in conjunction with the Independent Telephone Companies of America, with simultaneous use of wires.

Capital Stock, $18,000,000

VOTING TRUSTEES

HON. JOHN W. GOFF, New York, Judge of the Supreme Court.
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F. W. SHUMAKER, New York, Treasurer Sterling Debenture Corporation.
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The Telepost Company owns all the rights and patents of the Delany System of Rapid Automatic Telegraphy. After a successful, practical demonstration over a broad circuit in actual work, covering a long period, this system is now commercially perfected.

The Telepost Company is now preparing to construct its Boston-San Francisco Trunk Line. Financial arrangements are in the hands of the Sterling Debenture Corporation of New York, who are authorized to receive advance subscriptions, in small blocks only, from the Independent Telephone operators of the country.

Independent Telegraphy is the natural ally of Independent Telephony. Co-operation will assure rapid installation in all sections of the country.

The profits that will come to the original shareholders of the Telepost may be judged from the fact that, even with its greatly reduced rates, the new company will make a net profit per message three times as great as the old-time systems can make with their high rates. And this enormous profit will be distributed over an $18,000,000 capitalization, as against the $218,000,000 capitalization of the old systems.

With the unusual protection afforded to the small stockholders through the provisions of the Board of Voting Trustees, an investment in Telepost stock is as safe as a government bond, and the opportunity for subscribing is not likely to remain open long.

For prospectus and complete information address STERLING DEBENTURE CORPORATION, Brunswick Building, Madison Square, New York, or

TELEPOST COMPANY

225 FIFTH AVENUE **NEW YORK CITY**

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From Shops and Factories

NEW EXTENSION STATION EQUIPMENT.

SEVERAL months ago the hand telephone equipment for main station service manufactured by The Wire & Telephone Company of America, of Rome, N. Y., known as the Easophone was described in this paper. The adoption of this type of telephone created a demand for a similar equipment for extension station service, and the company has therefore designed and placed upon the market a set especially adapted to this class of service in offices, factories, hotels, residences and in railway work.

The Hand Telephone, although it had been in use abroad and to some extent in the United States for a few years, was not heretofore generally adopted owing to its fragile construction and limitations for long distance service. The instrument here described and illustrated is said to overcome these objections, being constructed as to be practically indestructible, giving no trouble to the user and greatly reducing the maintenance cost to the operating company or the owner of a private branch exchange system.

Fig. 1—Comfortable telephoning—with a hand telephone.

In residences the bell box, either with or without the hand instrument, is placed in the reception hall or some other centrally-located room, from which the bell can be heard in the other rooms where the switch hook boxes, each with its hand instrument are located. In the bedrooms these are usually on the wall at the head of the bed, so that the person in answering or calling need only take the instrument from the hook, which is usually within reach. In case of emergency, such as when one wishes to communicate with the police, fire department or doctor, this service is of great value. In the living room, den, drawing room, etc., the space occupied by the box and instrument is so small and the instrument so attractive in appearance that no objection exists to its installation, and that one need not leave the room for telephone service is a fact that meets with great favor. In many homes from two to three to as many as seven or eight extension equipments are in service. In offices the box is usually placed under the desk or in some out of the way location, since it need not be accessible as it does not get out of order, nor does the ringer need adjustment. The switch hook box can be placed on either side of the desk, or inside a roll-top desk, or on the side of a table. Fig. 1 shows how convenient and attractive the equipment is, and the fact that one need not, as is the case with the ordinary desk set, lift a heavy stand or move to reach it, saves time and energy. The breaking of parts in the desk stand equipment is due in a great many instances to its being knocked off the table or desk. This cannot be the case with the Easophone, for when not in use it hangs securely on the hook provided. From the detailed description it is readily seen that the equipment is practically indestructible, and its manufacturer claims that it is more efficient for long distance service than the ordinary type because of the length of the receiver magnet.

Fig. 2.—Another way—with a desk stand.

The transmitter, as shown by Fig. 3, is of a modern and efficient type. The solid tripod bridge threaded on the outside permits the piston chamber to be both concentric with the rear electrode piston and perpendicular to the frame of the diaphragm. A large number of the screws usually used in transmitter construction are eliminated, and the transmitter, as can be seen from the cut, is correspondingly simplified, and conforms to the narrow limitations so essential in the well-balanced telephone. The hard rubber mouthpiece is fixed to a knurled ring by means of a friction ring, and although it can be rotated, will not fall out.

The receiver, as illustrated by Fig. 5, is comprised of a long, powerful, high grade permanent horseshoe magnet, extending from the ear piece to the transmitter end of the instrument, being molded and solidly encased in vulcanized hard rubber, and riveted at the ear end to the supporting hook and to the Norway iron electromagnet core, over all of which is formed a solid molded covering of hard rubber. The slip coils, placed upon the electromagnet cores, are held rigidly in position by German silver plates. Two connecting screws in the receiver cup are provided for attaching the flexible silk cord and conductor directly to the receiver coil. This direct connection is made possible by a channel through the molded handle between the arms of the horseshoe magnet, and extending directly into the receiver case. This construction provides a magnetic field of high intensity at the pole base of the receiver magnet and affords a superior receiver for long distance use. The horseshoe magnet at the neutral point, or heel, is circular in form, and permits the transmitter cup to pass through the opening thus made, and by means of a clamp nut is permanently locked to the steel backbone of the instrument. The clamp nut is covered for the purpose of finish with a hard rubber screw cap, and this provides a solid backing for the transmitter front which encloses the diaphragm.

The bell box is formed from one piece of heavy cold rolled sheet steel. The box is treated to repeated coatings of baked japanned enamel, which gives it a highly polished finish. It contains the ringer movement, bell, induction coil, connection strips and the condenser. The Potter single coil ringer movement is not only compact, but highly efficient. It is of substantial construction and when assembled the coils are surrounded by the heavy horseshoe magnet, and thus protected on all sides against blows from which might result mechanical injury. The ringer movement is self-contained, and can be assembled and tested before being mounted in the box and fixed in permanent position, which is done by means of two screws, no solder or other means of connection being necessary. The movement consists principally of a wire helix, a permanent horseshoe magnet, and a vibrating arm freely operating within the helix and in the powerful magnetic field between the pole faces. No adjustment to the armature is necessary. The induction coil in the bell box is held rigidly in position by springs and when unsoldered from the wire form is readily removed. The condenser is of two microfarad capacity, small and compact with nickel-plated brass cone terminals. These cones are so located and so constructed

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THE CALCULAGRAPH

prints the time of day a message commences and mechanically computes the elapsed time between the commencement and finish of the conversation.

It relieves the operator of mental effort, prevents doubt and leaves no opportunity for argument.

The efficiency of your service is improved by its use.

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SIMPLICITY

Note how easy it is to splice pairs when you use HARGIS CABLE SPLICING JOINTS. Note how easy it is to get into the joint in case you have to test out for trouble.

If you are stringing several lengths of cable and a storm blows up, you can get your cable ends into a moisture-proof HARGIS JOINT in no time and thus prevent moisture from getting into your cables. When the weather clears up, your lineman can go out and splice the pairs in each joint.

While an expert cable splicer is rigging up his platform, etc., to start to work on a horizontal joint, a lineman can wipe in a HARGIS JOINT. The lineman can have all his pairs spliced and be off to the next job about the time the expert splicer would be ready to begin wiping the second end of his horizontal joint.

Making a splice with a HARGIS JOINT is so easy that you don't need a cable platform. There is no need for a drip pan to catch the paraffine, because the HARGIS JOINT is submerged in the paraffine pot, and there is no waste. The moisture has to go out. No uncertainty.

SEND IN YOUR ORDER TO-DAY

W. N. Matthews & Brother

Manufacturers of Patented Money Saving Specialties.

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Branches: New York and San Francisco.

FIG. 2.

Easophones

The WIRE and TELEPHONE COMPANY of AMERICA

ROME. N.Y.

FIG. 1.

FOR

Extension Telephone Service

The adoption of our Easophone Equipment No. 100 for main station service created a demand for an Easophone Equipment for extension service. Our Equipment No. 102 as illustrated meets every requirement of the subscriber and exchange manager. A study of its design and construction carries conviction that it is the most convenient, attractive, durable and efficient equipment on the market.

SUCH APPARATUS WILL PAY DIVIDENDS

The switch hook box with hand telephone, see fig. 2, occupies little space and is attractive in appearance. Can be placed on either side of a desk or inside a roll top desk, on the walls of a residence beside a bed, behind window or door hangings, any place in fact:-

BUT ALWAYS CONVENIENT

The bellbox, see fig. 1, is compact and can be placed out of sight in an office or residence, yet in a central location where it can be heard from any point. It does not get out of order, therefore need not be accessible.

Installations please the subscriber and pay the telephone company. Write at once for Bulletin No. 102, and follow this advertising series.

THE WIRE & TELEPHONE COMPANY OF AMERICA, Rome, N. Y.

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as to engage with two spring condenser connecting plates mounted upon and insulated from the steel boxes, the plates themselves being soldered to the wiring form. The condenser is rigidly held in position by means of these two plates, and an auxiliary heavy supporting spring located at the opposite end of the box. It may be removed at will, but it is impossible for it to be jarred from its proper position. In taking the condenser from the box or replacing it no tools or solder are necessary.

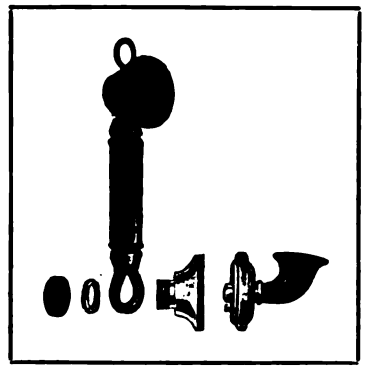

Fig. 3.—Easophone, with transmitter dissected.

The extension switch hook box from which hangs the telephone shown in Fig. 4, is stamped from sheet steel, and provided with flanges for mounting. The box is finished either in nickel or black enamel and is very attractive in appearance. A single metal stamped bracket is provided for assembling and holding in fixed position the entire actuating mechanism. The spring connecting plates and the hook and working parts are held in place within the box by a single screw, and all parts may be readily removed. By the use of inturned contact springs, acting upon the hard rubber roll placed upon the supporting or actuating hook, the use of auxiliary springs is made unnecessary. All contact springs are provided with platinum points. An insulating plate with brass lugs molded upon it is provided for direct connection to the flexible silk connector cord, stamped springs and plates provide all necessary means of connection, and there is thus afforded the necessary direct connection for any telephone circuit. The construction of all parts is of such a substantial character as to reduce chances for trouble to a minimum.

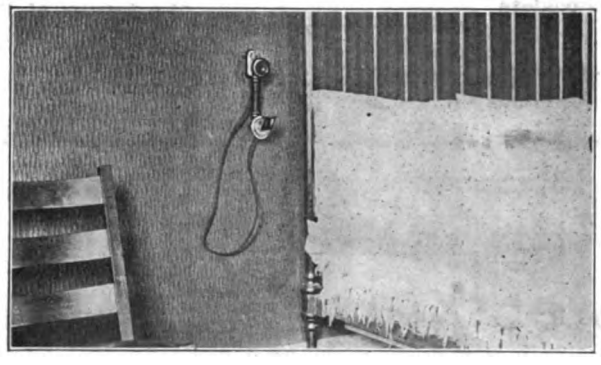

Fig. 4.—Typical location which demonstrates convenience of hand telephone equipment.

The Wire & Telephone Company of America has since the erection of its new buildings materially increased its manufacturing capacity, and is said to be making deliveries of this apparatus in a manner that meets satisfactorily a rapidly increasing demand.

METAL FURNITURE FOR OPERATING ROOMS.

IN choosing a chair for the use of operators the main things which a telephone company must consider are: In the first place, comfort; then adjustability, durability, and the ease with which the furniture may be kept clean. There should be as small a surface as possible upon which dust may collect, and it should be so arranged that it may be readily cleaned in the same way that everything in the operating room should be, to prevent unnecessary accumulations of dust.

The A. H. Andrews Company, 174-176 Wabash avenue, Chicago, Ill., believes that all of these requirements are met in an extremely effective manner in its chairs designed especiallly for switchboard operators. It makes several styles of chairs, but in all of them are embodied certain distinctive features. The height of the seat is adjustable by means of a screw working through a plate in the main supporting structure. This plate is supported by four legs formed of Bessemer spring steel wires twisted and interwoven to give the greatest rigidity and strength. These rods are plated in Japanese copper, giving a perfectly smooth surface, and a permanent finish which is of a pleasing color. The backs of the seats are supported by curved steel rods, which not only allow the operator to sit in a natural position, but have a certain amount of spring, which makes the seat an exceedingly comfortable one when an operator is kept at the switchboard for a long period. These seats revolve easily on a pivot, and in some of them the backs are adjustable, that is, may be set at a greater or less distance from the centre of the seat. A metal foot rest is attached to the supports. Taken altogether these seats represent some ideas which should be most satisfactory to exchange managers who wish to obtain the most satisfactory furniture for their operating rooms. The company issues an illustrated catalogue giving an excellent idea of the appearance of its goods, which will be sent to all interested persons upon receipt of a request.

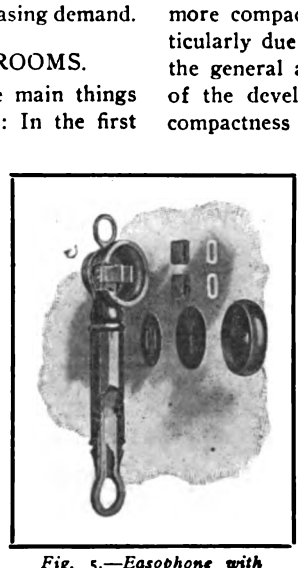

Fig. 5.—Easophone with receiver dissected.

MATHEW LANZ & SONS, of Pittsburg, Pennsylvania, who own and operate up-to-date manufacturing and galvanizing plants, announce that they have increased their facilities for the manufacture of the following: Cross arm braces, bolts, washers, fetter drive lag screws, pole steps, pressed steel and malleable iron guy clamps, guy rods, rock anchors, angle steel cable arms, shims, back braces, messenger clamps, double arming bolts, guy wire hooks, sheave wheels and frames, ground rods, thimbles, etc. The company is extending its business in all these specialties, and will be glad to furnish to interested persons any information desired, upon receipt of an inquiry.

DEAN ELECTRIC COMPANY, Elyria, Ohio, has lately published a new folder containing information about its No. 3505 type of common battery wall set. This instrument is designed to replace the No. 3010 type as a standard wall set. It is smaller, the condenser being reduced in size and the other parts rearranged in a more compact form. The advantages of the new type are particularly due to the small wall space required for mounting and the general accessibility of parts. This new type is an example of the development of Dean apparatus along lines of greater compactness and greater accessibility of working parts.

"CARBOLINEUM" A TRADE MARK.

JUDGE TARRANT, of the Circuit Court, has just decided that the word "Carbolineum" is a trade mark, to the use of which, as a designation for wood preservative paints, Richard Avenarius, of Germany, is exclusively entitled. This decision gives to the Carbolineum Wood Preserving Company, of Milwaukee, Wis., as agent, the exclusive right to use this word, which forms a part of the name of the well known compound "Avenarius Carbolineum," which designates the preservative compound which this company sells. It is said that actions will be instituted against all persons who have used, or who are now using this word without authority to designate wood preserving compounds. The company has been much annoyed in the past by imitations of the well-known preservative, applied to poles with a brush. In the future the name Carbolineum may be expected to serve as a guarantee that a preservative compound is the genuine product which this company sells.

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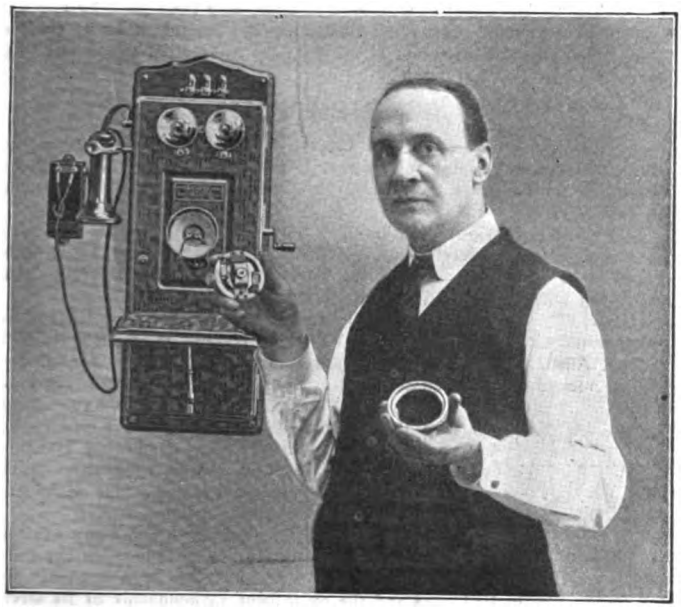
ANDRAE



Talks With the Treuhle Man

Talk is cheap; sometimes too cheap to be economical. This is invariably true if its means of conveyance is a cheap telephone receiver.

A telephone is a business necessity; its value is entirely dependent upon the service it renders. It cannot render good service for any length of time, unless it is made right. The *receiver* should respond accurately and distinctly to voice currents; it should be wound with the right grade of wire on the right kind of cores and have a permanent magnet, capable of retaining its magnetism. The *diaphragm* should be made of the best annealed Norway iron. The *connections* should be easily made and so arranged as to prevent short circuit. The *shell* should fit the ear comfortably. The *cap* should be reinforced to prevent cracking.

All of these points and a good many others are found in the Andrae Receiver. There are no good points in up-to-date telephone construction that cannot be found in the Andrae Special Heavy "GIANT" Bridging Telephone, and no bad points can be discovered by the closest inspection. *Andrae 'phones are built for business.*

CONDENSERS

Ninety per cent. of the ringing troubles that make telephone operators gray-headed and wear their tempers to shreds are due to receivers off the hooks. The cure for these troubles is so easy that it is surprising to find an operator who is not availing himself of it. *Condensers cure ringing troubles.* We prove it to your satisfaction by furnishing on trial enough No. 301 Condensers to equip one line complete, and will pay the freight both ways, if they do not prove all our claims.

DON'T WORRY, USE CONDENSERS

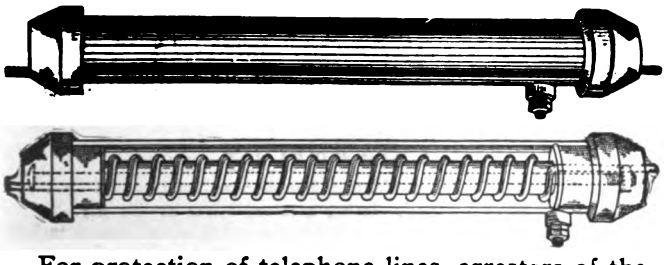
JULIUS ANDRAE & SONS CO., Write for Cat. No. 11 and No. 24
99 W. WATER STREET

MILWAUKEE

Thoroughly Efficient Protection

Is no more expensive than partial protection. This fact is proven by the very reasonable figure asked for

Sky Rocket Arrestors



For protection of telephone lines, arresters of the choke-retardation coil principle, if properly constructed, are the most efficient against high potential discharges.

SKY ROCKET ARRESTERS are the acme of this type of protection. Lightning will not pass the succession of coils into which the fifty inches of discharge surface is built up.

Write to-day and get our literature and prices.

CHANCE MANUFACTURING CO.

CENTRALIA, MISSOURI

PREMIER BB STEEL CORD

CONDUCTORS A-B are made of special prepared hard drawn steel wire, insuring flexibility and durability. Owing to the high resistance of the steel wire, a winding of copper wire is applied to reduce the resistance.

INSULATION C-D. Each conductor has a triple insulation, the first consisting of a serving of silk, the second of a serving of cotton, and the third a braiding of waxed cotton.

FORMATION. Both conductors are formed into a concentric spiral as illustrated by cut. Over the spiral is applied a braiding of cotton on the longitudinal effect for the purpose of taking up any possible stretch in the cord.

RE-ENFORCEMENT SPRING made of very high grade steel wire is inserted in the hollow of the cord at PLUG END for the purpose of doubly re-enforcing the cord at the end that is subject to the greatest usage. The spring is inserted in a manner that prevents the conductors from being thrown out of alignment, making it almost impossible to break the cord at the PLUG END—regardless of how the operator may insert or jam it into the switchboard jacks.

OVERALL BRAID E-F. Consists of special high-graded linen thread boiled in wax. A double braiding is applied at the plug end for the re-enforcement.

Let us quote you our new prices.
They're in your favor.

Runzel-Lenz Electric Mfg. Co.
97 101 South Clinton St., Chicago

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Live Telephone News

NEW COMPANIES.

HEBER, ARK.—An Independent telephone company, to be known as the Heber and Brownsville Telephone Company, is being organized at this city. The company contemplates the erection of a line from Heber to Brownsville, where connections are to be made with a line to Batesville and other points on the north and Judsonia on the east. The following officers have been elected: H. C. Brownfield, of Brownsville, Ark.; secretary, A. G. Morris, of Heber.

WATERLOO, IND.—An Independent telephone company is being organized by the people of this city. It will probably be known as the Home Telephone Company. Quarters have already been secured for the exchange. Among those interested in the enterprise is D. W. Strauss, manager of the Home Telephone Company, of Auburn.

AYRSHIRE, IA.—Articles of incorporation have been filed by the Ayrshire Farmers' Mutual Telephone Company. It has an authorized capital stock of $5,000.

IOWA FALLS, IOWA.—Another rural telephone company, to be called the Oakwood and Owasa Telephone Company, has been formed by citizens in and about Iowa Falls. It is capitalized at $2,500, with shares at $50 each, and the following officers and directors have been elected: President, E. W. Wolf; secretary, Geo. Baughman, Jr.; treasurer, J. A. Simpson; directors, the above named officers and E. Hayden and William Shaner.

BANTRY, N. D.—Articles of incorporation have been filed by the Bantry Telephone Company, of this city. It has an authorized capital stock of $10,000 and the incorporators are James McIntyre, D. K. McKain, G. R. Case, H. Wylie and Fred Rusk, all of Bantry.

FORBES, N. D.—The Forbes Rural Telephone Company, of Forbes, N. D., has been incorporated with a capital stock of $10,000. Among the incorporators are O. L. Schulstad, Forbes, N. D.; C. M. Axtell, R. Sager and others.

GLENBURN, N. D.—The Lone Star Telephone Company, of Glenburn, has been incorporated with a capital stock of $10,000. Among the incorporators are A. Walton, C. L. Matson and others of Glenburn, N. D.

GRAND HARBOR, N. D.—The Grand Harbor Telephone Company, of Grand Harbor, has filed articles of incorporation. The capital stock is given at $5,000, and the incorporators are Simon Kongslie, Devils Lake, N. D.; O. N. Dion, Grand Harbor, N. D., and others.

LISBON, N. D.—Among the newly organized Independent telephone companies is the Farmers' Southwestern Telephone Company, of Lisbon. It has an authorized capital stock of $10,000, and among the incorporators are Erik Sovdo, McLeod, N. D.; Geo. C. Jacobson, Lisbon, N. D.; Howard W. Gordon, Lisbon, N. D., and others.

QUAKER CITY, O.—The farmers of this city have decided to organize an Independent telephone company and install a switchboard. The new company is to be known as The Farmers' Telephone Company, and $3,000 of stock has already been subscribed. Among those interested in the new enterprise are W. A. White and F. T. Webster.

HOUSTON, TEXAS.—The Houston Home Telephone Company has been granted a charter. It has a capital stock of $1,000,000, and the incorporators are J. S. Slusher, F. G. Reed and J. H. Dwire. It is expected that about $600,000 will be expended in installing its system, the additional capital being provided for extensions as the business increases.

OAKVILLE, TEXAS.—An Independent telephone company, whose intention it is to construct a line from Oakville to Beeville, is being organized at this city. It is to have a capital stock of $1,200, of which $950 has already been subscribed.

STOCKDALE, TEXAS.—A Farmers' Telephone Company is being organized at this city, Mr. Parker, of Dallas, being one of the prime movers in the new enterprise.

VERNAL, UTAH.—The Uintah Telephone Company, of Vernal, has filed articles of incorporation. The capital stock is $10,000, with shares at a par value of $10 each, and the following officers have been elected: William H. Smart, president; C. S. Carter, vice-president; J. K. Bullock, treasurer; R. S. Collett, secretary.

ATHENS, W. VA.—The Athens Telephone Company, of Athens, has been incorporated. It has an authorized capital stock of $5,000 and the incorporators are W. J. Gautier, D. H. Thornton, S. R. Holroyd, W. F. Appling and J. F. Pennington, all of Athens.

DEWEY, WIS.—The farmers of Dewey are forming a new telephone company to be known as the Torun Telephone Company. Its intention is to build a line from Torun to Jordan, through Stevens Point.

NORWALK, WIS.—The Norwalk Independent Telephone Company, of Norwalk, has been incorporated with a capital stock of $6,000. Among the incorporators are John Berendes, Leo Nolan, Charles H. Schulte and others.

OAKLAND, WIS.—Articles of incorporation have been filed by the West Oakland Telephone Company, of Oakland. The capital stock is given at $350, and the incorporators are M. C. Kravick, Andrew F. Olson and G. C. Larson.

FRANCHISES.

DECATUR, MICH.—The Cass County Home Telephone Company has been granted a thirty year franchise at Decatur, and expects to install and operate an exchange at that place. An exchange is also being installed at Volina.

NORFOLK, NEB.—A franchise has been granted to W. J. Stadelman, of this city, who represents Independent telephone interests. It is his intention to install an Independent telephone system in Norfolk, which will bring long distance connections to this part of Nebraska.

MIDDLETOWN, O.—The Middletown Telephone Company, which was incorporated several months ago by Walter S. Harlan, D. B. Bundy, L. T. Palmer, Allen Andrews and others, has secured the franchise for which it applied recently at this city. It is for a term of twenty-five years and work on the company's system will be commenced at an early date. It will operate in connection with the Hamilton Home Telephone Company and will give free service to all points in Butler county, including Hamilton.

BAKER CITY, ORE.—The Baker Light & Power Company, of this city, has been granted permission to construct a telephone line eight miles long from Bourne, Ore., into the Blue Mountains national forest.

MENASHA, WIS.—The Fox River Valley Telephone Company has been granted a franchise in this city and expects at once to commence the installation of its system. The granting of this franchise has been brought about by the increase in Bell rates and the consequent abandonment of its service by the citizens of Menasha. The same condition exists in Kaukauna and Neenah, at which places systems are also to be established connecting with the Fox River Valley Company's exchanges at Appleton and Green Bay.

FINANCIAL.

SAGINAW, MICH.—A semi-annual dividend of 3 per cent has been declared by the Saginaw Valley Telephone Company on its preferred stock. A site has been purchased by the company for its new exchange building and work will be commenced at an early date.

NEW LEXINGTON, O.—The capital stock of the Perry County Telephone Company has been increased from $50,000 to $75,000.

AUSTIN, TEXAS.—At this city recently the Martin Telephone Company, of Llano county, increased its capital stock from $20,000 to $40,000.

MANITOWOC, WIS.—At a recent meeting of the Silver Creek Telephone Company the capital stock was increased from $1,050 to $5,250.

ELECTIONS.

DE FUNIAK SPRINGS, FLA.—The officers of the De Funiak Springs Telephone Company are S. K. Gills, president; B. P. Morris, vice-president; R. W. Storrs, secretary.

MT. PLEASANT, IOWA.—At the annual meeting of the Mt. Pleasant Telephone Company the following officers and directors were elected: W. J. Steckel, president; R. S. Galer, vice-president; W. E. Keeler, treasurer; E. E. England, secretary and manager; directors, W. E. Keeler, Frank Montgomery, H. J. Twinting, R. S. Galer and W. J. Steckel.

JAMESTOWN, N. Y.—The following directors have been re-elected by the Home Telephone Company: Arthur C. Wade, W. R. McCanne, John H. Wright, George R. Fuller, William J. Maddox, Seneca B. Burchard, Brewer D. Phillips, Ralph C. Sheldon, Carl F. Laumb and T. W. Finucane.

NORWALK, WIS.—The officers of the newly organized Norwalk Independent Telephone Company are John Berendes, president; Lee Nolan, vice-president; Charles Schulte, secretary; Herman Flock, treasurer.

MISCELLANEOUS.

BIRMINGHAM, ALA.—Considerable damage was done to the lines of the People's Telephone Company during a recent storm at this city.

MINIER, ILL.—The Minier Mutual Telephone Company is soon to become the property of Messrs. Reilly Bros., of Rankin, negotiations for the exchange now being under way.

ROCKWELL, IA.—The People's Mutual Telephone Company has transferred its Rockwell exchange to the newly organized Rockwell Farmers' Telephone Company, the consideration being $7,000.

LUVERNE, MINN.—The exchange of the Enterprise Telephone Com-

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OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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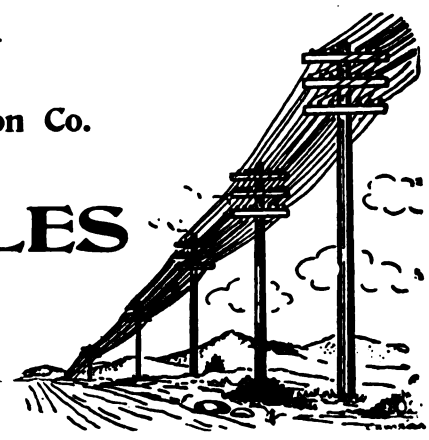

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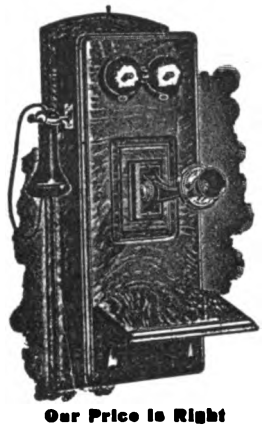

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Live Telephone News

pany in this city, as well as the line from Luverne to Magnolia, has become the property of the Luverne Telephone Company.

BLUE SPRINGS, NEB.—Arrangements have been completed whereby the New Home Telephone Company of, Beatrice, is to have connections with the toll lines and exchanges of the Gage County Independent Telephone Company at Blue Springs. This combination will enable the New Home Company to give its patrons service to Barneston, Odell, Wymore, Liberty and Oketo, Kas.

HAMILTON, O.—During a recent storm in this city considerable injury was sustained by the lines of the Home Telephone Company.

HARRISBURG, PA.—At a recent meeting of the American Union Telephone Company, held at Harrisburg, the acquisition of the Maryland, Pennsylvania and West Virginia Telephone & Telegraph Company, known as the Tri-State Telephone Company, was approved, as was also the purchase of the Bedford County Telephone Company.

BONHAM, TEXAS.—The plant of the Texas Telephone Company has been taken over by R. R. Derrett, of Kentucky, the consideration being $27,800. It is the intention of the new owner to make many improvements in the system.

CAMERON, TEXAS.—The citizens of this city are considering the advisability of organizing an Independent telephone company to operate in opposition to the Bell company.

CLAUDE, TEXAS.—The telephone line between Conway and Panhandle has been acquired by A. P. McCubbins, who is at the present time installing a new telephone system at Claude.

LANCASTER, WIS.—The Union Telephone Company, of Lancaster, has been taken over by the Farmers' Telephone Company.

OSCEOLA, WIS.—Connections between the Osceola Mutual Telephone Company and the St. Croix and Amery Telephone Companies are to be established.

SPOONER, WIS.—The St. Croix Farmers' Mutual Telephone Company, of Swiss, expects to connect its lines with those of the Spooner Telephone Company.

PERSONAL.

J. H. COOPER, formerly in the contract department of the Central Union Telephone Company at Terre Haute, Ind., has been appointed chief clerk to the district superintendent, succeeding R. C. Horn.

H. A. LONG has been appointed manager of the exchange of the Central Union Telephone Company at Logan, Ohio. Mr. Long formerly occupied the position of chief inspector in the same exchange.

New Lines and Exchanges

COLUSA, CAL.—Work on the construction of its system at this city has already been commenced by the Colusa County Telephone Company. It expects to construct lines to Maxwell, Arbuckle and Williams; in fact, it will ultimately cover the entire county.

QUINCY, CAL.—A telephone line from Quincy to Prattville, with branch lines from that place into Humbug Valley, is to be erected by the Forest Service.

TRINITY CENTER, CAL.—It is the intention of the Forest Service, which has already completed a line from Sisson to Trinity Center, to construct fifty miles more east of Sisson in the McCloud district, and the Sisson-Trinity Center line is to be extended to Weaverville.

DE FUNIAK SPRINGS, FLA.—The De Funiak Springs Telephone Company, which operates lines from this city to Freeport, Marianna and other places, is building lines to Crestview and Laurel Hill.

GRAYSLAKE, ILL.—New lines are being built by the Lake County Telephone Company.

HILLSBORO, ILL.—Among the improvements being made by the People's Mutual Telephone Company is the installation of a new switchboard.

DANVILLE, IOWA.—A toll line from Danville to Lowell is being constructed by the Danville Telephone Company.

SIOUX CITY, IA.—Among the improvements planned by the Sioux City Teelphone Company is the erection of about two hundred miles of new line. One line is to connect Sioux City with a large number of towns in South Dakota, connections being made at Salem and Mitchell. Work on a line from Sioux City to Omaha, Neb., which will follow the towns on the extension of the Burlington Railroad as far as Fremont, has also been commenced.

LITCHFIELD, ME.—New lines north of Litchfield Plains are being erected by the North Eastern Telephone Company.

MONROE, ME.—New lines in this city are being built by the Farmers Telephone Company.

PHILLIPS, ME.—Additional improvements in its system at this city are being considered by the Northeastern Telephone Company, and a new line from Phillips to Rangeley is also to be built.

ALMA, MICH.—About $25,000 is to be expended by the Union Telephone Company in the proposed extension of its plant. The company controls about thirty exchanges in central Michigan.

CASS CITY, MICH.—A number of lines are to be added to the local telephone company's plant, which was recently taken over by Cass City.

GROSSE POINTE FARMS, MICH.—A line between Lake Shore (P. O. address Grosse Pointe Farms) and Walkerville has been erected by the Lake Shore Telephone Company, and connection between the exchanges in the two towns effected.

REED CITY, MICH.—The new exchange building of the Citizens' Telephone Company is nearing completion and a new switchboard is to be installed.

COMFREY, MINN.—Among the improvements planned by the Comfrey Rural Telephone Company is the enlargement of its exchange and the building of a number of new lines.

FAIRMONT, MINN.—The system of the Fairmont Telephone Company is being extended.

BUTTE, MONT.—Work on the installation of its new system is under way at this city by the Montana Independent Telephone Company.

SPRINGFIELD, MO.—Work on the construction of its system is soon to be resumed by the Home Telephone Company at this city.

CRETE, NEB.—The Independent Telephone Company, which was granted a franchise in this city in the spring, expects to commence the construction of its exchange building at an early date.

GIBBON, NEB.—The Farmers Home Telephone Company has installed a new switchboard and is otherwise improving its system.

MORAVIA, N. Y.—A new line from Moravia to Cascade has been built by the Farm & Village Telephone Company, and it is its intention to extend its lines through to Venice and Scipio.

NEW LISBON N. Y.—The lines of the New Lisbon Telephone Company are being extended.

NORWICH, N. Y.—Arrangements are being considered for connecting the lines of the Marquis Independent Telephone Company with the Newton Independent Telephone Company at Earlville. This connection will give the Marquis company direct communication with practically the whole of Madison county, as the Newton Company has a great number of lines throughout Madison and Oneida counties.

PERRY, N. Y.—Many improvements and extensions in its system are being made by the Perry Telephone Company.

ST. JOHNSVILLE, N. Y.—Additional cables are being strung by the Interstate Telephone Company to take care of its increased business.

WATERLOO, N. Y.—The Home Telephone Company, of this city, is extending its lines to Kidders and Sheldrake.

FAYETTEVILLE, N. C.—The Carolina Telephone & Telegraph Company, whose charter has recently been amended, expects to install a thoroughly modern system, with double metallic circuits and long distance connections.

MEADVILLE, PA.—The Crawford Telephone Company is constructing its system at this city, and it is its intention to install a central office very shortly.

TUNKHANNOCK, PA.—Improvements in its system are being made by the Tunkhannock & Wyoming Valley Telephone Company.

ROSCOE, TEXAS.—Many improvements in its system in this city are being made by the Texas & Pacific Telephone Company.

CHELSEA, VT.—Work on the construction of its new trunk line from Chelsea to South Royalton is now under way by the Orange County Telephone Company, whose intention it is to continue the line to Randolph.

RICHMOND, VA.—The Washington, Arlington and Falls Church Railway expects to install and maintain a system of telephones by which communication may be effected between the dispatcher's office and the various stops on the road.

PASCO, WASH.—The Standard Telephone Company, which was granted a franchise last March, is engaged in installing its system in this city, and in establishing a local exchange.

WHEELING, WEST VA.—The National Telephone Company expects to have long distance connections with Parkersburg in the near future. It is stringing wires to Sistersville, and the West Virginia Western Telephone Company, of Parkersburg, is stringing wires from Sistersville to Parkersburg.

UNDERGROUND.

ELGIN, ILL.—Telephone wires are to be placed underground in the business districts of the city of Elgin.

WOODBURY, N. J.—The Eastern Telephone Company is to place its wires underground in this city.

GENEVA, N. Y.—The Geneva Telephone Company is preparing to commence its conduit work in Geneva.

WAHPETON, N. D.—All telephone wires are to be placed underground in this city.

NEW CASTLE, O.—Many of its wires in New Castle are to be placed underground by the Union Telephone Company.

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Installing Telephone Apparatus with Native Labor in the Philippines

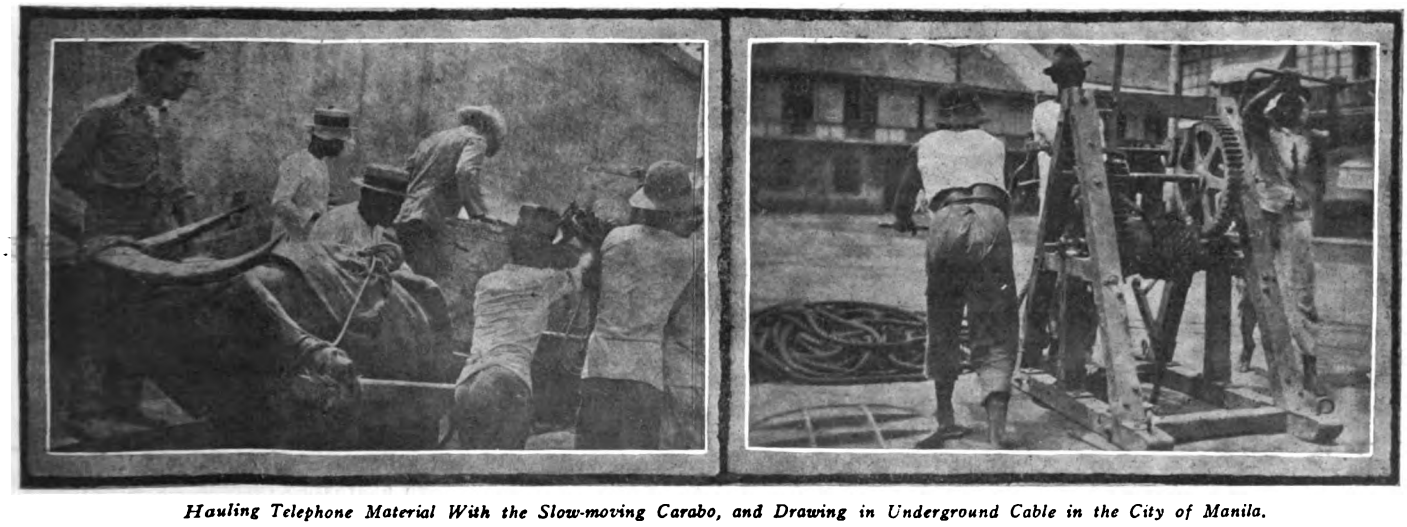
By B. H. Skinner.

SPEED in the performance of his work is something which the installer of telephone apparatus in foreign countries, and particularly in the Far East, can hardly expect to attain with the aid of native labor. When the writer of this article arrived at Manila to install the exchange of the Philippine Islands Telephone Company the first delays were met in clearing the customs examination, etc., which took considerable time. Then came the features more intimately connected with getting the material into place, and the apparatus set up and in operation. Here the foremen encountered elements decidedly novel, but not contributing materially to the object of advancing the work rapidly. In the first place all the material had to be hauled from the wharves to the exchange by what would be considered in most places a rather primitive method. It was loaded by native labor into a two-wheel cart, drawn by an animal called a carabo, or sometimes known by the name of water buffalo. A view of a gang of natives unloading telephone apparatus for the Manila exchange from one of these carts is shown in one of the accompanying illustrations. The material was taken from the wharf to the central office in a very leisurely fashion, so much so that at first those in charge of the work would refer jestingly to the speed of the carabo as one mile an hour. As day after day went by without seeing the finish of the transportation part of the job, occasionally some one in exasperation would remark that the figures for the animal's pace should be corrected to one mile a month; and hardly any one who has used this kind of a team will object to the change.

By the time the material was on the ground the workmen, who had been putting up the reinforced concrete building for the exchange, had about enclosed the first floor. The conduit and power apparatus was at once put in place. After this work had been done the balance of the building was nearly roofed in, and ready for the switchboard, so that the work progressed in an orderly fashion.

When it came to looking after the minor details, such as the making of special iron work, and the obtaining of odd pieces of hardware, there was a decided call for both patience and ingenuity. The blacksmith shop where the iron work for the switchboard was done was simply a sort of open shed, having no sides whatever, and a thatched roof, so that the native workmen pounded out their pieces of iron leisurely while getting the benefit of all the air there was stirring, to counteract the heat of their little forge.

Work was carried on upon the cable plant and outside construction at the same time the exchange was going in, and here too it was necessary to use native labor, although the job was in charge of experienced American foremen. The standard of construction here needs to be fully as high as anywhere in the United States, on account of the climatic conditions which must be encountered, and the native laborers had to be very carefully supervised. One of the illustrations shows the men drawing in the cable on the Plaza de Goita, Manila, and it will be seen that the work is going forward vigorously enough. This work was carried on under considerable difficulty at times, on account of the backing up of water from the sea into the manholes. The office manhole in Manila contained about two feet of water all the time, except when the tide was low, and when the men were working in it pumps had to be run continually. Conditions nearly as bad were encountered in other places.



Hauling Telephone Material With the Slow-moving Carabo, and Drawing in Underground Cable in the City of Manila.

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Talking and Telegraphing Simultaneously Over the Same Line

Article I—The Repeating Coil and the Simplex Circuit

By N. C. Kissell.

TO-DAY a person can talk over a long distance telephone line from New York to Chicago while four telegraph messages are being transmitted over the same wires, and under normal conditions there will be not the slightest annoyance from interference between any of these messages. The apparatus used to make this possible, while nearly perfect in action after having gone through a carefully directed process of evolution, is worked on such simple principles that the making up of "extra circuits" from existing telephone lines may be clearly explained without the use of mathematics.

A simplex circuit is an arrangement of a single pair of wires to form one metallic circuit telephone line and one grounded telegraph line. The basis of this arrangement is ordinarily a repeating coil, and the efficiency of a circuit depends to a considerable extent upon the design and construction of this piece of apparatus. The coil used by the largest company engaged in this class of business, which has been developed by a series of careful experiments, and has been for some time in successful use in its present form, consists of an iron core, toroidal in shape, made up of a bundle of small iron wires, around which are wound coils of insulated wire. There are four groups of windings (*a, b, c, d,* Fig. 1) the resistance of windings *a* and *b* being 30 ohms each, while coils *c* and *d* are wound to 35 ohms each. In practice terminals of each set of windings are brought out to lugs on the wooden base upon which the coil is mounted. When connected into a simplex circuit the windings *a* and *b* are connected together as shown, *c* and *d* also having their inner ends joined.

By tracing the effect of certain electrical currents in the repeating coil itself an understanding of many principles which determine the operation of a simplex circuit may be obtained. If an electric current is suddenly caused to circulate through windings *a* and *b* in series it will create a magnetic flux in the iron ring. This flux will have a definite direction, depending upon the direction of the electric current in the coils surrounding the iron. This magnetic flux, of course, forms a closed magnetic circuit through the entire circumference of the iron core, and consequently passes through the windings *c, d.*

Under these conditions any change in the strength of the original current passing through windings *a* and *b* will vary the intensity of the flux passing through coils *c* and *d,* and if they are in portion of a closed metallic circuit will set up in them an induced current. When an alternating current circulates in coils *a, b,* a corresponding alternating current is set up in *c, d.* The ratio of the strength of current induced in *c, d* to that of the original current depends approximately on the ratio of the numbers of turns in the two windings to each other. If the windings *a, b* each have 50 turns and *c, d* 10 turns each, then the E. M. F. induced in *c, d* will be one-fifth of the E. M. F. impressed on *a, b* for any change in the intensity of the lines of force. If the windings *a, b* had 10 turns each and *c, d* 50 turns the E. M. F. induced would be five times that impressed on *a, b.* If *a, b* had 50 turns each, and *c, d* 50, the E. M. F. induced in *c, d* would be equal to that impressed on *a, b.*

This is true providing there are no losses in the repeater itself. It would be the ideal equation, but is not strictly true on account of certain losses in the coil which are encountered. The losses in a repeating coil (or transformer) are (a) losses of E. M. F. in overcoming the resistances of the coils; (b) losses of power in the coils (c) loss of power in the iron core due to hysteresis and eddy currents. From this it follows that the coils must be of as low resistance as possible to keep down the loss of power due to the current passing through the coils so that practically all of the E. M. F. induced in the secondary coil will be available at the terminals of that coil.

The primary and secondary coils must be wound very close together, so that no perceptible portion of the magnetic flux that is forced through the core by the magnetizing current may flow out of the core between the coils, instead of passing through the secondary as well as through the primary coil.

It will be seen that when an alternating current is passed through the coils the core is being constantly magnetized in one direction—then demagnetized and remagnetized in the opposite direction, this operation being repeated over and over again at a very rapid rate. This gives rise to what is called a "hysteresis" loss. When a piece of iron is subjected to an alternating increasing and decreasing magnetizing force, the magnetism for equal magnetizing forces will not be the same, and it is found that the magnetism lags behind the magnetizing force, or in other words, the metal has a tendency to maintain any magnetic state which it has once acquired. This property of iron is called "hysteresis" from the Greek word meaning to "lag behind." The actual change in the magnetic condition of the iron lags behind the state of variation in the magnetizing force, as if there were a certain molecular friction of the iron which had to be overcome. There is, therefore, a certain loss in energy due to hysteresis which is dissipated in the form of heat. The harder the iron the greater the hysteresis loss. This loss varies as the magnetic induction raised to the 1.6 power, and is also proportional to the rate at which the reversals of magnetism take place and, of course, the greater the amount of metal in which the reversals occur, the greater the total hysteresis loss. This loss due to hysteresis cannot be accurately determined. For very soft iron the loss of energy during a complete reversal of magnetism is slight; with hard iron the amount of energy wasted per cycle is greater.

In a telephone circuit the frequency of the alternating talking currents is enormously high, being from 300 to 600 vibrations or periods per second. When an alternating current of such high

Editor's Note.—This is the first of a series of articles on the principles governing the use of telephone lines for the simultaneous transmission of multiple messages.

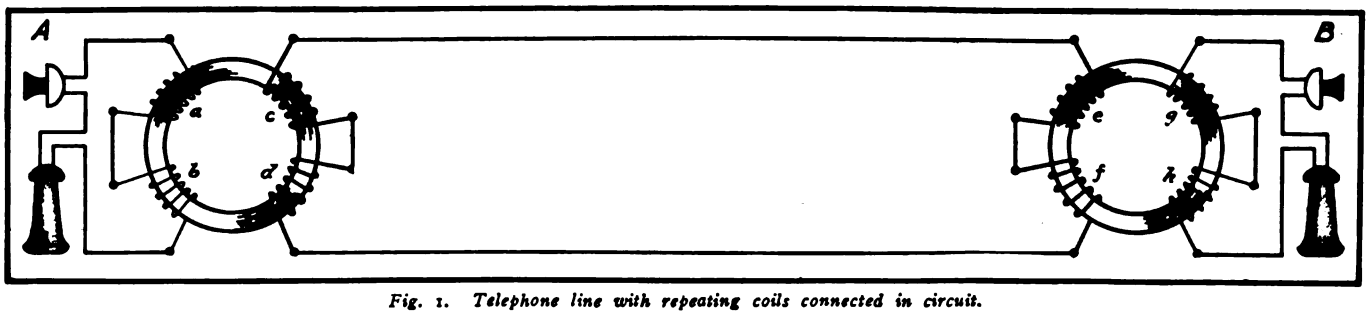

Fig. 1. Telephone line with repeating coils connected in circuit.

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frequency is passed through the primary of the repeating coil it will be seen that the magnetic flux set up in the core by this rapidly varying E. M. F. must be in exact step with it, and induce an E. M. F. in the secondary of exactly the same frequency as that of the inducing current. Suppose we connect a telephone instrument to the primary of the coil and a receiver to the secondary. When speaking in the transmitter the high frequency talking currents passing through the primary must induce an alternating current in the secondary of exactly the same frequency, in order to reproduce a sound of the same pitch as was spoken into the transmitter. Sounds are distinguished in three ways: by loudness, depending on the energy of the vibrations of the air particles adjacent to the ear drum; by pitch, depending on the frequency of the vibration, and by character, the quality which distinguishes between human voices and musical instruments, or between one voice and another. The alternating current passing through the primary winding induces in the secondary an alternating current of a higher or lower tension (depending on the ratio of the two coils), but these alternations must be in perfect harmony with the original sound vibrations. As the current for talking is of very high frequency, it follows that if the iron in the core of the repeating coil is at all sluggish in its action, due to hysteresis, the transmission will be distorted so that speech will not be heard plainly. The core of a coil with a closed magnetic circuit is more sluggish than one with an open magnetic circuit, and the core composed of a large amount of iron more sluggish than one with a small amount, but a core with an open magnetic circuit would be subjected to a large magnetic leakage. Obviously, then, the core to be used in a repeating coil to be adapted for the transmission of speech should have a closed magnetic circuit, and be as small in mass as possible, and made of very soft iron, in order to reduce the magnetic leakage and magnetic lagging of the core flux to prevent any distortion of the sound waves. Such a one is obtained by making the core of small annealed iron wires, and of such volume as will enable it to carry the greatest flux which it will be called upon to carry, without reaching its saturation point.

Figure 1 shows a telephone circuit with two repeating coils introduced. When station *A* is transmitting speech to *B*, an alternating current will be set up in *a*, *b* and in consequence, as has been indicated, an alternating current of the same frequency will be induced in the windings *c*, *d*. This induced current passes over two line wires and then through windings *e*, *f*, inducing in turn a current in windings *g*, *h*, which passes through *B*'s instrument reproducing sound. When *B* is talking the action is reversed. It will be seen that the current which passes through *B*'s instrument is not the same one that was set up by *A*, but an induced current, one which has undergone two transformations, and it must be exactly the same as the one set up by *A* in frequency and other characteristics in order to reproduce the same sound as that imparted to *A*. In a simple telephone circuit, that is one where the two instruments are connected together only by the two line wires, the currents that are set up by *A* pass over the line wires through *B*, and suffer a loss due to the resistance and reactance of the line wires. When the repeating coils are introduced into the circuit the current still suffers the loss due to the line wires, and also the losses due to the repeating coils on account of the transformation of energy within them. From this then, a telephone circuit with repeaters in it is not as efficient for speaking as one without, and their effect is more pronounced on long lines than short.

There is another consideration to be taken up, and that is signalling on this circuit. This, of course, will have to be done with alternating current on account of the transformations to be undergone in the repeaters. The ordinary ringing generators used in exchanges of to-day are of low frequency usually from 20 to 30 cycles per second. The hysteresis and eddy current losses in the iron cores of the coils depend a great deal on the frequency of the circuit, as also the magnetic flux. Here then the coils are called upon to operate on several different frequencies. If they have an efficiency of 95 per cent. for talking, they will not be so high on low frequency and may be only 35 or 40 per cent. efficiency. This is offset to a certain extent, by the strength of the ringing generator current which is very powerful when compared to the talking currents. As transmission of speech is our most important consideration, it has been settled that the coil to be used is one which will transmit the high frequencies very efficiently, a generator of comparatively high voltage being used to ring. The writer has described the action of the repeating coil at some length, as in his experience he has seen several coils placed on a line through which speech could be carried on very well, but it was impossible to ring through the coils. This action could not be accounted for by those concerned. Also, what has been said concerning the coils will be frequently referred to later when taking up phantom circuits and superimposed currents.

If one connects up the repeating coils at their centers with a third wire as shown in figure 2, this arrangement will have a certain effect on the talking circuit. Assuming that *a*, *b* and *g*, *h* each have 1,000 turns of wire, and *c*, *d*, *e*, *f* each have 2,000

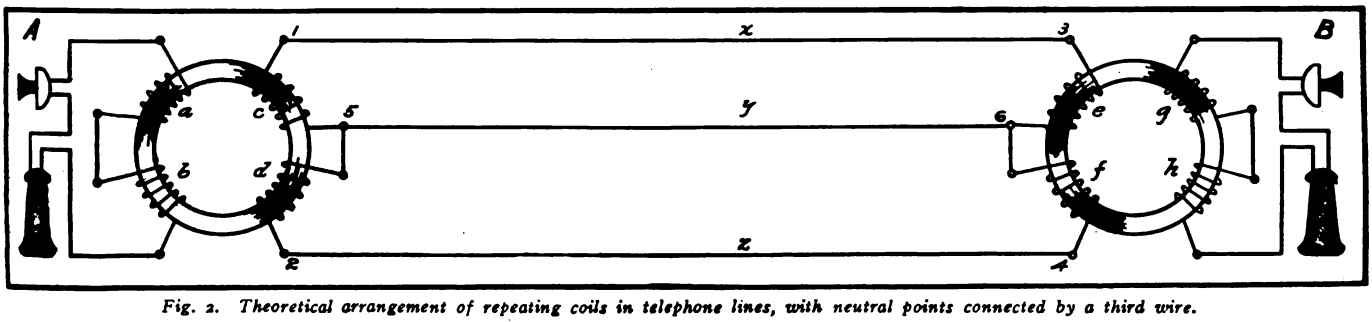

Fig. 2. Theoretical arrangement of repeating coils in telephone lines, with neutral points connected by a third wire.

turns, if an alternating E. M. F. of 100 volts is impressed, on *a*, *b* there will be an E. M. F. of 100 volts induced in each winding of *c*, *d*. As these are connected together in series and both windings wound in the same direction, a total voltage of 200 volts will be induced across points 1 and 2. At a given instant then this current starting at point 1, will pass over wire *x*, to point 3, through coils *e*, *f*, to point 4 over wire *z*, back to point 2. This current passing through windings *e*, *f*, induces a current in *g*, *h*. Assuming for the sake of simplicity that there is no line loss the E. M. F. of the current passing through *e*, *f* will be 200 volts. As *e*, *f* each have 2,000 turns and *g*, *h* each have 1,000, the E. M. F. induced in *g*, *h* will be 100 volts or the same as that impressed on *a*, *b*. Here then we have transformed the E. M. F. from 100 to 200 volts and again from 200 to 100 volts.

In the first case we have stepped up and in the second stepped down the voltage. This is done to give a higher pressure on the line wires to transmit the current without such a great loss in power. Point 5 will therefore be at positive-negative potential, minus for the 100 volts induced in winding *c*, and plus for the 100 volts induced in winding *d*. In other words, point 5 will be at neutral potential as will likewise point 6, consequently there can be no difference of potential between points 5 and 6, and no current will flow over wire *y*, but will flow over wires *x* and *z* as indicated by the arrows. The current would tend to flow in both directions in wire *y*, and as the two divisions are equal they neutralize each other. Therefore, it makes no difference whether the repeating coils are connected together at their centers by a third wire or not as far as the telephone circuit is concerned.

(To be continued.)

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The Seasoning of Telephone and Telegraph Poles*

By Henry Grinnell.

ALL poles used were peeled immediately after being cut and were then hauled or rafted to the seasoning yard, where they were skidded in single tiers about 2 feet above ground.

As soon as possible after being placed on skids each pole was numbered, its weight taken, and its circumference at 6 feet and at 30 feet from the butt (or 25 feet in the case of the shorter poles) recorded. Weights and measurements were taken about once a month until the poles had practically ceased to lose weight. To determine the volume, weight per cubic foot, and specific gravity of the poles, a series of circumference measurements were made at the butt, at successive 5-foot points, and at the top.‡

Although poles were cut in all twelve months of the year, it has been thought best in grouping the results to classify them as spring, summer, autumn and winter cut, beginning at March 1. The tables show the average weight per cubic foot at the time of cutting and at subsequent seasoning intervals. The weight per cubic foot was found by dividing the weight of the average pole by its volume, which in turn was calculated from the average of the circumference measurements and from the length. The weight of the average pole at each seasoning stage may be found from the tables by multiplying the weight per cubic foot at the desired time by the volume of the pole. The dry weights of cedar and chestnut wood used in the computations are those given by Sharpless, in Vol. IX, Tenth Census.

Duration of seasoning, months.	Spring cut. Weight per cubic foot, pounds.	Spring cut. Moisture content,* per cent of dry weight.	Summer cut. Weight per cubic foot, pounds.	Summer cut. Moisture content,* per cent of dry weight.
0	34.8	68	36.6	77
1	27.7	34	28.5	38
2	26.3	27	26.8	29
3	25.9	25	26.5	28
4	25.7	24	26.5	28
5	25.6	24	26.7	29
6	25.5	23	26.8	29
7	25.4	23	27.0	30
8	25.4	23	26.9	30
9	25.3	22	26.7	29
10	25.0	21	26.7	29
11	——	—	26.6	29
12	——	—	26.5	28
13	——	—	26.4	28
14	——	—	26.2	27
15	——	—	26.2	27
16	——	—	26.1	26
17	——	—	26.0	26

Duration of seasoning, months.	Autumn cut. Weight per cubic foot, pounds.	Autumn cut. Moisture content,* per cent of dry weight.	Winter cut. Weight per cubic foot, pounds.	Winter cut. Moisture content,* per cent of dry weight.
0	38.7	87	38.9	88
1	29.5	43	29.9	44
2	27.9	35	28.3	37
3	27.7	34	26.7	29
4	27.5	33	26.5	28
5	27.2	31	26.0	26
6	26.7	29	25.7	24
7	26.5	28	25.6	24
8	26.2	27	25.6	24
9	26.0	26	25.6	24
10	25.9	25	25.5	23
11	25.7	24	25.5	23
12	25.7	24	25.5	23
13	25.7	24	25.5	23
14	25.7	24	——	—
15	25.7	24	——	—
16	25.8	25	——	—
17	——	—	——	—

*Dry weight, according to Sharpless (Vol. IX, Tenth Census), is 20.7 pounds per cubic foot.
The average volume of 30-foot poles was 20.76 cubic feet, and of 25-foot poles, 14.53 feet.

Table 1. Weight and percentage of moisture of white cedar poles at Wilmington, N. C., based on 600 poles.

Tables 1 and 2 show the results of seasoning cedar poles from ten to seventeen months at Wilmington, N. C. Table 1 gives the weight per cubic foot and the percentage of moisture at various stages of seasoning of the average pole in each season's cut, assuming the dry weights of the wood to be 20.7 pounds per cubic foot. Since these poles had been in water for varying lengths of time before a weighing could be obtained, the weights may not correspond with those which would have been obtained starting with green wood.

From Table 1 it is evident that poles cut in autumn and winter weighed more per cubic foot when they came out of the water than those cut in spring and summer, and thus had to lose more water before reaching dryness. The table also shows that spring-cut wood continued lightest as long as weighing was continued. At the end of six months, however, the difference between the spring and winter cut is insignificant. In a carload of poles it would amount to only about 250 pounds.

Duration of seasoning, months.	Loss of first weight. Spring cut, per cent.	Summer cut, per cent.	Autumn cut, per cent.	Winter cut, per cent.
1	20	22	24	23
2	24	27	28	27
3	26	28	28	31
4	26	28	29	32
5	26	27	30	33
6	26	27	31	34
7	27	26	32	34
8	27	27	32	34
9	27	27	33	34
10	28	27	33	34
11	—	27	34	34
12	—	28	34	34
13	—	28	34	34
14	—	28	34	—
15	—	28	34	—
16	—	29	33	—
17	—	29	—	—

Table 2. Loss of first weight of white cedar poles at Wilmington, N. C.

Table 2 gives for the average pole cut in each of the four seasons the loss in percentage of the original weight at different periods of seasoning.

Table 2 is based on the original weight, and, unlike Table 1, does not consider the dry weight of the wood. There is, therefore, a variation between the two tables in the relationship between the seasons of cutting and seasoning. While the winter-cut poles contain a greater amount of water at first, they season most rapidly and regularly after the first month and show increased loss of moisture each month until practically air dry. In the autumn and spring cuts the drying is continuous, but less regular, while in the summer cut, after three months, an increase in water content begins, and continues till about the ninth month.

Tables 1 and 2 show, then, that poles cut in spring contained less moisture than those cut at other seasons and continued lighter throughout. Winter-cut poles, although heavier when green, dried out faster than those cut in other seasons, but never caught up with the spring-cut poles. Summer-cut poles dried out rapidly for the first few months, but drying ceased with the approach of winter and the weight was not further reduced until the following spring.

(To be continued.)

*Abstract from a Bulletin of the U. S. Forest Service, continued from the issue of July 27.

AN EXAMPLE OF ACCURATE TESTING ON THE NEW YORK CENTRAL TELEPHONE LINE.

WHEATSTONE bridge tests, which make it possible to figure the location of trouble to a point within four or five ohms resistance of the place where it is actually found, were referred to in a recent paper as common occurrences in connection with the maintenance of the long line of the New York Central Railway. This statement appeared in the paper by Mr. Van Akin, assistant superintendent of telegraphs, which was read at the convention of the Association of Railway Telegraph Superintendents, and published in The American Telephone Journal of July 6.

Realizing the interest which telephone men must take in work

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conforming to such a high standard, the Editor invited Mr. Van Akin to forward detailed reports of the number of tests of typical troubles. One of these reports is as follows:

"On Saturday, July 13, I was at our test station, Ravena, N. Y., when two Western Union wires, numbers 210 and 211, were found to be swinging to ground between Ravena and Canajoharie, a distance of 62 miles. The trouble would first appear on one and then the other; later, however, both wires were grounded and remained so.

"To comply with your request to furnish some particular instance of accurate Wheatstone Bridge measurements, as practiced on our lines, I personally measured the trouble, using one of our copper wires as a clear lead to pick up each of the faulty wires in turn at Canajoharie.

"The loop resistance in both cases was 681 ohms, and the Varley 270 ohms, figured on a 62 mile basis; the resistance of each pair of wires, measured, was about 11 ohms per mile, which located the faults 24½ miles east of Canajoharie, or 37½ miles west of Ravena.

"Lineman was ordered out at 11:35 A. M., but did not get started until after dinner. He found the trouble 25 miles east of Canajoharie, 37 miles west of Ravena, caused by both wires being against a tree, so he reported. This, you will note, was only 5 ohms at variance on wires measuring 11 ohms to the mile. Our wires at that point are detoured around a stone crusher and quarry through the woods. The trouble was cleared at 1:25 P. M. The insulation resistance of each of the pairs after the trouble was cleared, was about 67 megohms per mile."

This accuracy of measurement is made possible not only by the care bestowed upon the construction and maintenance of the line, but on the openness of the right of way. Other interesting reports have been received, and will be published in a later issue of the JOURNAL.

INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION BULLETIN NO. 2.

July 25, 1907.

DESPITE the prevailing hot weather, an active interest in Association matters continues. Important meetings have been held in a number of the States during July, and others are scheduled for August. Independent men everywhere should remember that they will be welcome at all these meetings, which they can attend, whether members of the Associations holding them or not.

The officers of the Canadian Independent Telephone Association announce their annual meeting for September 4th at Toronto, and extend a cordial invitation to Independent telephone men in the United States, particularly to the officers of their sister organizations, to attend and participate. The Canadian Convention is being held during the Toronto exhibition, so that very low railroad and steamboat rates will be in force from all parts of the United States. A hearty welcome and enjoyable time is promised all who accept the invitation.

District Meetings.

The importance of district meetings should not be overlooked by the officers of the various Independent associations. These meetings form the basis of real progress in organization work. No efforts should be spared to make them attractive and as interesting and profitable as possible. They should be held as frequently as the needs of the various associations demand; in the older and well established associations quarterly, and in the newer organizations at least semi-annually. Care should be taken in selecting the most centrally located points for the sites of district meetings, and in order to increase the interest invitations should be extended to the members of associations in neighboring States. For this reason, it has been suggested that the secretaries of the various associations correspond with each other before arranging a schedule of district meetings, in order to avoid conflicting dates.

District meetings should begin early in September, as soon as the vacation season is over.

Your Association stands ready at all times to assist in any way that it can in adding to the success of the district and State meetings.

Assessments.

Call for assessments is being sent out by the secretary. The attention of officers of the various associations is called to the necessity of making prompt remittance on their assessments, so that your executive officers can carry on the important work undertaken. No definite plan can be executed until available funds are on hand to pay the cost.

Progressive Publicity.

Reiterating the suggestion made in the last bulletin, every one in the field is urged to lose no opportunity to *boost the telephone business.* It is only by keeping the facts constantly before the telephone-using and the investing public that we can hope to secure the complete recognition our business deserves, and to impress upon every one the excellent opportunities it affords for conservative investments that yield the very best returns.

Identify Your Company as "Independent."

In this connection, attention is called to the importance of educating all of the people to the extent and unity of the Independent movement. Whatever may be the local name of your company, see that it is known as "The Independent company." Call attention to this in your advertisements, news notices, circular matter, etc., and see that placards to this effect are conspicuously posted on your cable reels, poles, wagons, etc., and other outdoor construction material. For special suggestions along this line, address the General Office at Cleveland, Ohio.

Use of the "Shield."

The discontinuance of the Supply Department, announced in the last Bulletin, does not mean that the Association attaches less importance than formerly to the use of the "Shield." On the contrary, no efforts will be spared to increase the use of the emblem everywhere. The Supply Department has merely been discontinued in order to relieve the officers of your Association from a certain amount of detail work, so that they may be free to devote their entire energies to other important matters demanding their attention, and because they believe that such action can be taken without interfering in the least with the continued spread of the use of the "Shield," since it is felt that the various supply dealers can be depended upon to take care of the increasing demand for the emblem in its various forms. Independent companies who are not giving "Shield" advertising the attention it deserves should wake up to the importance of doing so, and take advantage of the special low prices being made to close out the stock on hand in the Supply Department. Already a number of supplies have been sold out entirely. There is still a fair sized stock of others on hand, however, but in order to secure the bargains offered, quick action is essential. Prices and particulars will be cheerfully furnished upon application.

1906 *Convention Proceedings.*

There is still a supply of these left, which will be furnished free on receipt of 8 cents to cover postage. This is a very valuable book, containing important data of interest to every Independent telephone man; a copy should be in the library or on the desk of managers everywhere.

1907 *Convention Proceedings Free.*

All desiring copies of the last annual convention proceedings will please write the Assistant Secretary at once, stating number wanted. This information is necessary to provide a sufficient number of copies for distribution.

International Schedule of Meetings.

It is planned to have a representative of the International Association attend all conventions of affiliated associations. To do this, it will be necessary to arrange a schedule of meetings without conflicting dates. It has been suggested that the schedule begin with the Southern States in January, the various States

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following in the most convenient geographical order, at least ten days apart.

The Associations are requested to advise with the International concerning this matter before fixing dates for meetings after the Chicago convention.

Right Policy.

The right policy for every Independent telephone manager to assume is to see that the most and best service for the price is furnished. Remember that service is the only thing you have to sell. Better service and not lower rates is what the people want. Therefore, it is business to see that the very best service is supplied.

Duplication of Telephone Service.

If any information is needed on this subject, an unanswerable argument will be furnished on application to the Assistant Secretary.

Cost of Service.

If you do not know what service is costing, get busy and figure it out. Before you can sell a thing at a profit, you must know what it costs. Information can be had along this line by addressing the President direct.

Uniform Bookkeeping.

If the Independent telephone people are to educate the investing public, it will be necessary to make intelligent statements, and before intelligent statements can be supplied, correct and uniform bookkeeping system must be adopted.

Suggestions and Criticisms.

The officers of this Association invite suggestions, pertaining to Association matters, occurring to the readers, from time to time, or if there is anything being done that does not meet with approval, friendly criticism is invited.

Managers, Take Notice.

The International Independent Telephone Association, through its Publicity Department, stands ready to furnish members reading notices covering any phase of the operating field, whether to defend or *boost the telephone business,* increase rates, show cost of plants, or on any other subject, *free of charge* on application. Write to-day, stating your wants. Make use of the Publicity Department.

The Extension Station as a Valuable Adjunct to Regular Service*

By W. W. Kinsley, Jr.

WHEN more than one extension station is connected to a line one of the combinations most frequently found desirable is arranged on a circuit which may be developed from the one shown in Fig. 4. This arrangement, illustrated in Fig. 5, involves the use of a three position key, adjusted to stick when thrown to either end. A bell for receiving signals from the central office is independently connected to springs of the key, which is located beside the extension instrument. A vibrating bell and calling key at each station, in connection with a suitably wired local battery, furnishes a means of calling between persons at the main and extension sets.

With the three position key in its middle position the main station receives all incoming calls; either station being able to call the central office. The extension station of course can talk with the central office, but cannot be called because its bell, connected with the springs of the key, is on open circuit.

If it is found on receipt of a call at the main set that the extension station is wanted the ringing key at the main station is depressed, ringing the vibrating bell at the extension station. The extension station on answering may if desired throw the three position key to operate the springs at the top, making the line a private line and short-circuiting the main instrument in the same way as in Fig. 4. Under these conditions the alternating current bell at the extension station is connected to the line, and as long as the key remains thrown any calls from the central office are received directly at this set. Should the key be left in this position inadvertently the main station may be signaled to answer by pushing the key which controls the vibrating bell, the three position key being at the same time thrown back to normal position. Failure to answer the call from the extension station would be followed by a second ring from the operator at the central office, received this time at the main set. There is consequently no danger of calls being lost or "hung up" through failure to transfer them properly.

If the three position key be made to operate the springs at the bottom, then the bell at the extension station is left on the line and the two stations have a private line established between

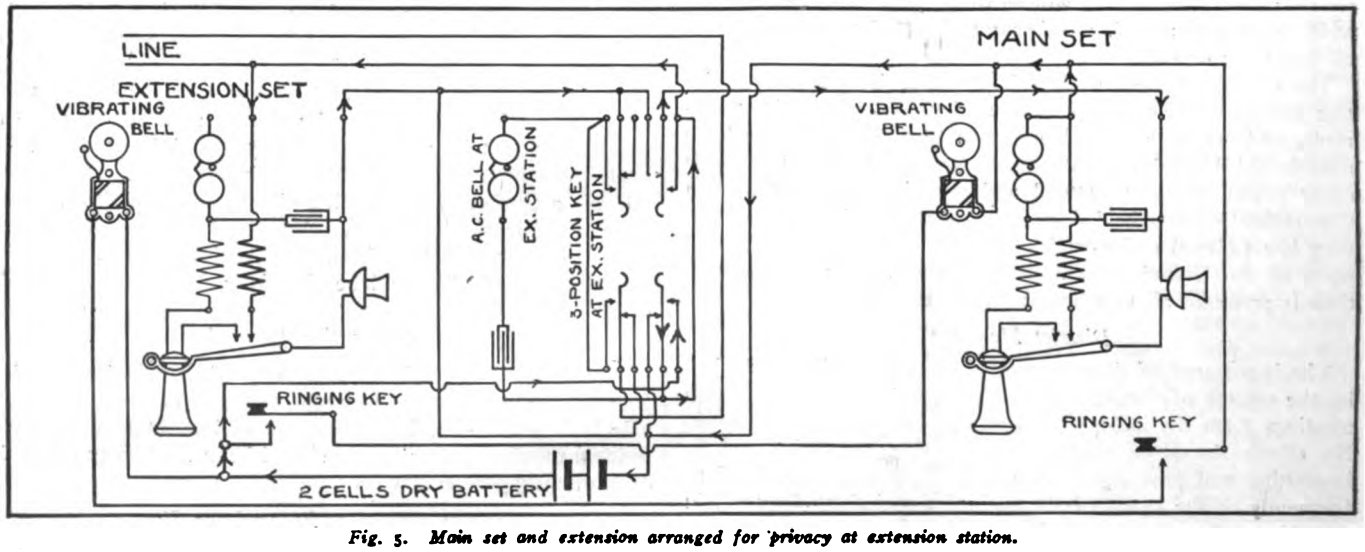

Fig. 5. Main set and extension arranged for privacy at extension station.

*Continued from the issue of July 27.

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them with vibrating bell and push button call. Under these conditions no calls can be received from the central office at either instrument. The talking circuit for communication between the two stations is indicated by the arrows showing that the current passes through contacts in upper and lower groups of springs on the right hand side of the three position key and through the two cells of dry battery used for ringing the vibrating bells, which in this case furnish current for the two transmitters.

The simplest wiring involving three stations and one line would of course be to bridge them all on the line either with or without bells and with or without cut-off keys. The circuits would then be similar to those shown in Figs. 2 and 3.

A more flexible system is shown in Fig. 6. Here all calls come in at the main station and if either of the extension

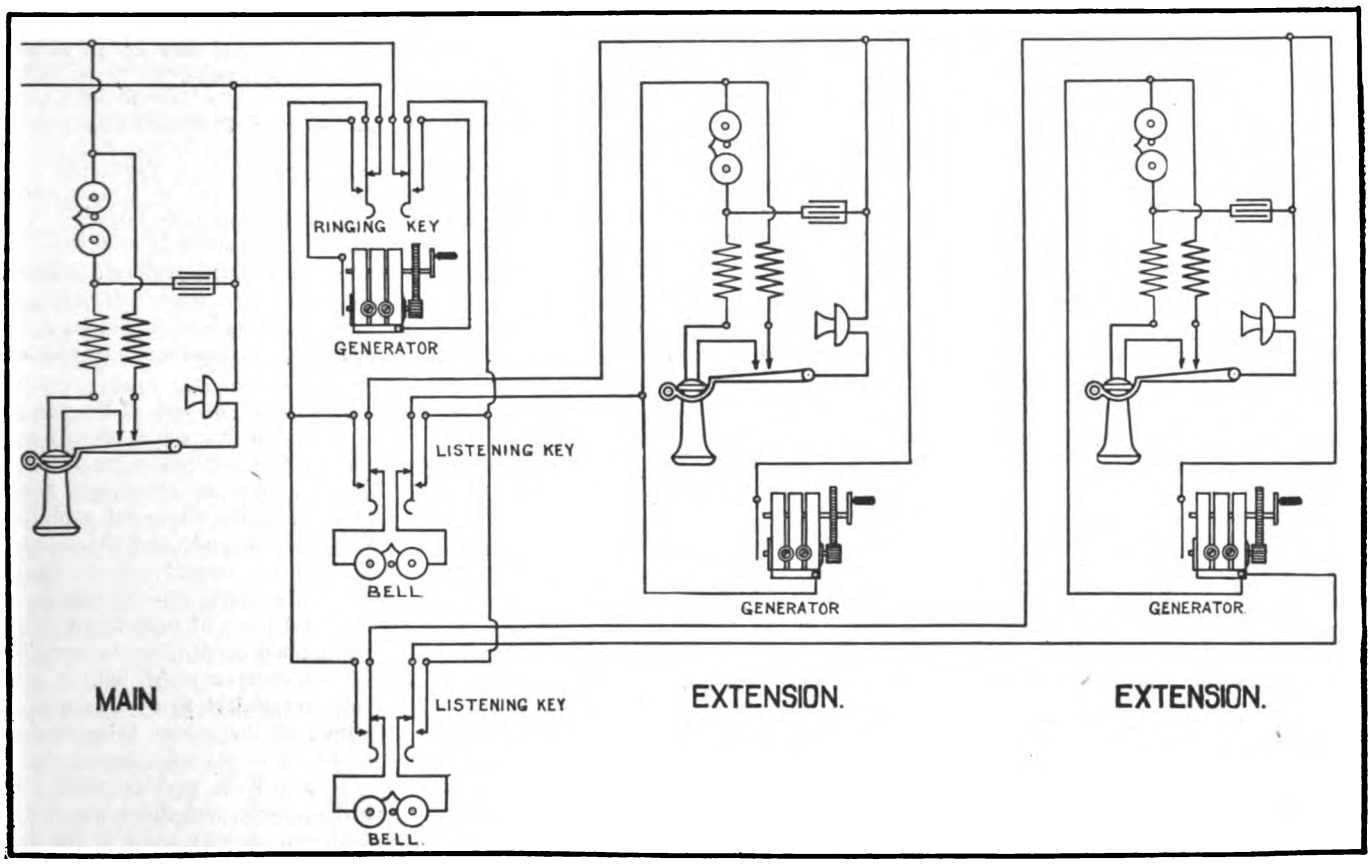

Fig. 6. Circuit for receiving calls at main set and throwing them to either one of two extensions; main set permanently bridged on line.

stations is wanted the proper listening key is thrown to connect it to the exchange, the main set remaining permanently bridged on the line. To call the extension set the ringing key is depressed, and the crank of the generator turned. The operation of the ringing key temporarily disconnects the extension set from the main line, so that no disturbance occurs at the central office when a local station is called.

With the keys in the normal position either extension set may call the main station by means of its generator, and so get exchange connections. The main station upon receipt of a request for such a connection throws the proper listening key, connecting the extension to the exchange line. Should any key be left in the thrown postion the corresponding extension as well as the main station will be called by the central office operator.

(To be Continued.)

HOME TELEPHONE AND TELEGRAPH COMPANY, OF PORTLAND, OREGON, MAKES STATEMENT OF DEVELOPMENT.

STOCKHOLDERS of the Home Telephone & Telegraph Company, of Portland, Ore., have just received a statement of the condition of the company's system in Portland, mailed under date of July 22. In this statement, issued by order of the board of directors, General Manager A. L. Têtu states that the system adopted is of such flexibility and capacity as to provide for a possible ultimate installation of 99,999 individual lines, while the present exchange building has sufficient capacity for 22,000 circuits. In addition to the main exchange and general office building, the company owns two other exchange buildings, in a part of one of which is located the equipment of the Northwestern Long Distance Telephone Company, which now has 89 towns in Oregon connected with the system of the Home Telephone Company in Portland. A list of these towns which is printed in the report shows that few important places in this district are without the Independent service.

In the city of Portland the company has in operation at the present time, 5,276 telephones. The rates are $6.25 per month for business telephones and $2.25 per month for residence telephones. On each class of service a discount of 25 cents a month is allowed if settlement is made at the office of the company on or before the 10th of each month. Rental for service was scheduled to begin August 1st.

In addition to the property in Portland the company holds Independent plants at Albany, Corvallis and Oregon City and other towns will be built in the future. Subscribers are already receiving service and many favorable comments upon it have been made.

The company expects to install a considerable number of additional stations as soon as the people in Portland have had an opportunity to become thoroughly familiar with the merits of the Independent system.

DAMAGES ONE DOLLAR PER MILE ON RAILROAD RIGHT OF WAY.

A JURY at New Orleans, Louisiana, has granted the Cumberland Telephone & Telegraph Company the right to condemn a right of way over the Yazoo & Mississippi Valley Railroad from Jackson to Harriston. Damages were assessed at one dollar per mile, making a total of seventy-one dollars for the entire distance over which the proposed line is to extend.

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Looking Forward

HIGH INSULATION AND ACCURATE TESTING.

EXCEPTIONALLY interesting reports, giving figures obtained in measurements taken during the course of maintenance work on the New York Central long distance telephone line, are being contributed by Mr. Van Akin, who, as Assistant Superintendent of Telegraphs, exercises supervision over this work. The first report of a trouble which he has forwarded for publication appears upon another page of this issue, and other statements of tests occurring during actual routine work will follow in later issues.

These reports confirm his statement regarding the accuracy of measurements on this telephone line made in his paper on the "Maintenance and Operation of Telephone Service on Railroad Companies' Lines," read before the convention of the Association of Railway Telegraph Superintendents. It will be recalled that he drew attention to the fact that on a railway line test points are located on an average of every 20 miles apart, and Wheatstone bridge measurements are effectually employed at long range, trouble being located, as a rule, within three or four ohms from the spot indicated by the test. Of course such accuracy in testing is possible only when the line is built in the most substantial manner, and well maintained, so that the introduction of resistances which are likely to vary is practically unknown. In ordinary work on telephone lines, leakage to ground, or sometimes the presence of a reverse condition, due likewise to poor insulation, causing the presence of a foreign potential on the telephone lines, complicate the testing problem extremely. These conditions are almost wholly absent on the railway line and are largely responsible for the unusual results which are regularly obtained in testing for such trouble as is brought in by accidents affecting the wires.

Mr. Van Akin's reports, showing not only the results obtained in standard tests for the location of trouble, but also the insulation of lines, point to a standard of maintenance so high that they are exciting much interest wherever they are read and considered. They show what is possible on lines having a clear right of way which keeps the lines well isolated from trees and other objects liable to produce a foreign contact. With such a high standard of insulation, which of necessity is accompanied by a grade of construction due to workmanship which insures the highest degree of permanence, the frequency of occurrence of trouble is undoubtedly reduced to a minimum. When trouble does appear, it may be cleared in the shortest possible time, owing to the fact that a lineman has to waste but a few minutes in looking for the fault after he has reached its approximate location, and an extremely small amount of supplementary testing has to be undertaken. The result on a long line, where every minute out of service is liable to represent a considerable loss, is likely to show very interesting figures when reduced to dollars and cents in comparison with the cost of interruptions on a line built and operated under less rigid standards. This is entirely aside from the fact that the transmission is so much improved that communication over very long distances is accomplished without effort by those who have occasion to use such a line.

NEATNESS AND DURABILITY.

NOWHERE is the fact more emphasized than in telephone work that a clear cut, clean looking job is likely to be the most durable. This does not necessarily mean that all woodwork should have a high polish, or a smooth finish imparted only by days of rubbing, but it has a very direct application to whatever lies behind the woodwork. For example, multiple cables which are laid together closely in regular alignment, without kinks and twists, will stand, if they have to do so, a great deal more moving about than those which are not neatly laid up. In the latter case, any wedging which may be necessary to get at a jack is likely to put an uneven tension upon the wires, and the troubleman in repairing one fault may easily produce half a dozen new ones. The same thing applies to the formed portion of the cable. If all wires are brought out to the jacks of the proper length whatever strain may be put upon them is distributed evenly, so that there is little likelihood of breaking joints after the jack is once clamped in place. It is a certainty that a small, bright, smoothly covered joint has been soldered with a hot copper, and this insures a joint which is mechanically firm and electrically perfect. On the contrary, a joint which shows a big rough lump of solder is likely to have quite the opposite mechanical and electrical qualities. It is not unusual to see one of these lumps jar off after a while, showing an improper, dirty contact between the two portions which should have been brought into a perfect metallic union. Examples of this sort can be cited without number, and they all go to show the permanent value of careful workmanship.

A DAMAGING SORT OF PUBLICITY.

SENSATIONALISM is the chief stock in trade with some newspapers, and they will go very far to find a subject which they can treat in their characteristic fashion. Telephone companies have to stand their full share of attention; but, when it comes to portraying a comparatively trifling accident in a most startling fashion, we believe nearly every one will agree that the clipping reproduced on another page of this issue is both in respect to the extraordinary series of headings and the body of its text a masterpiece.

As a matter of fact, in the case which so excited the reporter who contributed the item in question, a few cables were burned out. It seems that the telephone company which operates the exchange in Webster was about to move its office, and a temporary ground was installed. Ordinarily all aerial cables are bonded together and to the suspension wire, and the whole is thoroughly grounded just outside the central office. In this case, however, owing to the changes which were going on, the ground had been made by driving a piece of pipe down outside of the building. This connection could hardly handle more than five amperes. When the cable became crossed with a street railway circuit it was, of course, insufficient to take care of the current; and the result was that, all the cables being strapped together at the entrance to the building, with practically no ground connection, they were burned off at this point. The central office protectors worked perfectly, and there was not the slightest damage to the switchboard; but as soon as the cross was removed it was found that not a line at the central office was working, owing to the damage to the cables. Still this exchange has only about 350 subscribers, with trunk lines to neighboring towns and cities, and the occurrence hardly warranted the "scare heads" in what claims to be the leading paper of one of the most important manufacturing cities in the country. Although the reporter, who had apparently been badly frightened by the sparks which he saw when the trouble started, set the damage at $2,000, it cost the telephone company rather less than one-fifth of that sum to repair it. All that was required was the insertion of three tips on cables at the central office, and about two hundred feet of cable used in various places where the sheath had been burned, and the necessary work was very quickly performed.

The whole occurrence shows how necessary it is for representatives of telephone companies to put forth their best efforts to keep in close touch with the publishers of local papers. A single item like the one we have shown will give to timid people a fright which will keep them from using the telephone for a long time; and once an impression of possible danger has been produced, it is impossible to counteract it by reasoning. If officials of telephone companies would only make a practice of giving interesting news about the operation of their plants to papers as often as possible, when an emergency comes they would be able to supply all necessary information quietly, and keep their names out from under "scare heads."

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From a Legal Viewpoint

CONDUCTED BY A. H. McMILLAN.

REGULATION OF WIRES IN DELAWARE.

Will you kindly print a statement of what regulations exist in the State of Delaware for the stringing of wires and erection of poles in the streets?

Also tell us what redress there is against a man who represents himself to be a property owner, and so induces us to build a line out to his farm, which, in reality he does not own at all. This is what happened to us and it cost us nearly a hundred dollars loss. We are now unable to even get the rental from him. J. H. G.

THE Delaware law provides that telegraph and telephone wires shall be attached to poles at least 12 feet above ground, except where they enter a house. The penalty is twenty dollars, which belongs to anyone who sues for it. Rev. Code 128, Section 19, p. 938.

Procuring services of a telephone company upon false pretences is a misdemeanor in the State of Delaware, punishable by a fine of twenty-five dollars and imprisonment, at the discretion of the court. Laws of 1905, Ch. 211. The person who represented himself to be the owner of property, obtaining your services upon false pretence, or representation, is therefore subject to the penalty of this statute.

CONSTRUCTION OF RIGHT OF WAY GRANT.

A DEED to a water company granted a right of way over the grantor's land for the laying of water pipes within a space not exceeding ninety feet wide "with the right to set up, operate, and maintain a telegraph and telephone line or lines thereon, and with the right to ingress and egress to and from said right of way for all purposes." It has been held by the Chancery Court of New Jersey that such a grant does not confine the water company to a telegraph or telephone line used exclusively for the uses of its water works plant, but entitles a telephone company, which has an assignment from the water company, to use the right of way for the maintenance of a commercial telephone line.

The question arose in a suit brought against owners of the property over which the right of way was granted to restrain them from interfering with the telephone lines by cutting the company's wires. The defendants justified their conduct on the ground that the company was increasing the burden of the easement beyond the scope of the original grant. The court said that it was not easily perceived how the adding of additional wires and cross-arms to the poles increased perceptibly the burden of the easement. The defendants offered proof to show that at the time the original grants were made the purchasing agent of the water company stated to the grantor that the telephone line was to be used only to assist in the construction and maintenance of the water works. This remark, the court held, did not rise to the dignity of a contract or representation which affected the transaction. N. E. Tel. & Tel. Co. vs. Hepburn, 65 Atl. 747.

CARE REQUIRED OF TELEPHONE COMPANY WHOSE WIRES ARE IN PROXIMITY TO AN ELECTRIC LIGHT WIRE.

THE wires of the Citizens' Telephone Co., of Houston, Texas, were strung above a light and power company's wires, which were charged with a current strong enough to produce death. At eight o'clock one evening one of the telephone wires was broken and lay upon the street until about six o'clock the next morning. A mule came in contact with it and was knocked down and slightly injured. A man broke the wire and extricated the mule, and in order to remove the wire from the street, wrapped it around a post to which was attached a guy wire of the lighting and power company. About two hours afterwards a man named Jesse Thomas, in hitching his horse to this post, came in contact with the wire and was killed. The wire, in falling, had struck the wires of the light and power company, and was thus charged with sufficient current from these wires to cause death to anyone coming in contact with it. The wife of the deceased brought suit against the company for damages and was given a verdict for $2,000. The evidence showed that the telephone company had a man called the "wire chief" whose duty was to exercise a general supervision of the wires, and two "trouble men" whose duty it was to correct and remove any trouble with regard to the wires when reported. The trouble men were also inspectors of the line, but made their inspection from the ground. These men went off duty at 5:30 p. m. and did not return to work again until 7:30 a. m.

On appeal by the company to the Court of Civil Appeals of Texas the judgment was affirmed, it being held that the company was negligent. The company contended that the death of Thomas was really caused by the act of the man who picked the wire up from the street and wound it around the post, but this contention was not approved by the court. In its decision, the court laid down the principle that where a telephone wire is so constructed as to render probable that, in falling, it will come in contact with another company's wires charged with a dangerous current, the telephone company is held to the same degree of care as though its own wire were charged with such current. Citizens' Tel. Co. vs. Thomas, 99 S. W., 879.

SEVEN THOUSAND EIGHT HUNDRED DOLLARS FOR 78 DAYS' DELAY.

THE Cumberland Telephone & Telegraph Company does not always win its law suits. A verdict for $7,800 against it was given by a jury in the Federal Court at Memphis, Tenn., in an action by C. J. Kelley, who sued for $8,000, claiming that he ordered a telephone installed in his residence, but that it was not put in until 78 days later. Under the law the company is liable for damages at $100 per day. It is altogether probable that an appeal will be taken from this verdict and the final disposition of the case will be watched with much interest in the local field.

COMPANY SUED BECAUSE BURGLAR USES TELEPHONE POLE.

MANY are the sins for which a telephone company is held responsible. The latest illustration of this is an attempt of Elizabeth Jenkins, of Louisville, Ky., to recover twenty-five thousand dollars damages for injuries to herself as the result of the Home Telephone Company erecting a pole too near her premises. She states that because of the proximity of the pole to her window, a negro burglar was enabled to enter her room on the night of December 3, 1906, gather up her property, assault her, bruising her badly, and finally throwing carbolic acid in her face, blinding her so that she was not able afterward to identify him. She alleges that she warned the company at the time it was placing the pole that it was closer than provided by law, but that the company paid no heed to her warning. It hardly seems that the damages she alleges can reasonably follow as a result of the telephone company's location of the pole, even if it were illegal and afforded the burglar means for entering her apartment.

ADMISSIBILITY OF TELEPHONIC COMMUNICATIONS.

IN General Hospital Society vs. Haven Rendering Company, 65 Atl. Rep., 1065, the Connecticut Supreme Court holds that a conversation by telephone between an agent of a corporation at its office, with a person in the office of another corporation, speaking for it, though unaccompanied by evidence that the person speaking for the latter was authorized to use its telephone for the purpose of communicating messages from its office, other than the presumption arising from the use of the telephone in the course of business, is *prima facie* admissable for any purpose that a conversation otherwise had with a person at the office of the latter corporation, apparently in charge thereof, as its representative, would be admissible.

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Operation and Opposition

RUSSIAN GOVERNMENT CONSIDERING THE ESTABLISHMENT OF NEW LONG DISTANCE LINES.

IT is reported that the Russian Council of Ministers at St. Petersburg has taken up the consideration of a project for establishing telephonic communication between Moscow and Nishni-Novgorod, Moscow and Ivanoff-Voznessenck, Kharkoff and Yekaterinoslav, and Kharkoff and Bakhmut. It is said that if plans are approved arrangements will be made for having such lines constructed by private enterprise.

VANDALISM IN TENNESSEE.

THE Cumberland Telephone Company has been kept busy during the past week repairing its lines which have been persistently cut by unknown parties in Smith County, Tenn. The trouble arose over a rule recently adopted by the company denying to subscribers for the service the right to allow their friends who were non-subscribers the privilege of the use of instruments. The attempted enforcement of the rule has caused much friction. Early in the week at Riddleton fourteen of the company's lines were cut, severing connection between Dixon Springs, Hartville and other paying centers of the telephone traffic. The lines were promptly repaired and communication restored, and the trouble was thought to be over. Two days later, however, seven lines in the same locality were cut, and it seems that the trouble is just beginning.

TEXAS CITY REFUSES TO GRANT POLE SETTING PERMISSION TO TELEPHONE COMPANY WHILE FRANCHISE MATTER IS PENDING.

AT San Antonio, Texas, it is reported that the city council refused to issue permission to the Southwestern Telegraph & Telephone Company entitling it to set poles in the streets. It is said that the reason for this action is an attempt to bring the company into line with the council's wishes in the matter of adjusting its franchicse.

BLAKE TELEPHONES CONDEMNED AT TEXAS MASS MEETING.

THE substitution of "long distance" for "Blake" telephones, with the well known corresponding change of rates, which in this case were to be increased from $1.50 to $2.00 per month, was the reason for a decided protest against the telephone company by many citizens at Cameron, Texas. Circulars distributed on the afternoon of July 10th brought together about seventy-five or one hundred people at the Court House at five o'clock. Mr. J. L. Lockett was elected chairman, and Ben L. Grimes, secretary. Speeches condemning the company's plan were made by a half dozen of the leading citizens, and the company was heartily condemned for not living up to its promises to give the people better service, as well as for the demand for an increase in rates. The people who are up in arms against the Bell company say that if an Independent company can be induced to operate in the city they will boycott the old service.

CUMBERLAND TELEPHONE COMPANY TO BE FORCED TO SECURE FRANCHISE AT MOUNT VERNON, IND.

CITY ATTORNEY ZIMMERMAN, of Mount Vernon, Ind., has announced that at the next term of the Posey County circuit court he will institute proceedings to compel the Cumberland Telephone & Telegraph Company to secure a new franchise. The company is now alleged to be operating without a franchise in the city, and the City Attorney wishes to have it bound by an agreement which will secure more favorable treatment by the telephone company to its patrons.

The original franchise under which the company operated was granted more than fifteen years ago, and contained a clause giving the city the right to revoke the franchise. It expired some time ago, and the city consequently claims that the company is operating without any right whatever. In 1899, it is said, the American Telephone & Telegraph Company was granted a perpetual long distance franchise, which bound it with only a single stipulation, namely, that it was to use straight poles. Some time afterwards the American company assigned this franchise to the Cumberland company, but as no entry of the assignment was made in the records of the city, in the spring of 1906 it was declared forfeited by the council, on the ground that it was a dead franchise. Since then negotiations have been going on with the object of compelling the Cumberland company to secure a new and satisfactory franchise, but they have been unsuccessful. There have been many differences between the respective interests, and matters are now approaching a climax.

RESPONSIBILITY FOR DEATH OF HORSES.

HORSES were killed during a recent electrical storm in Michigan under circumstances which left considerable doubt not only as to the responsibility, but the cause of the accident. The circumstances are stated as follows:

The Cass County Home Telephone Co., of Dowagiac, Mich., is building a new exchange at Dowagiac, and has been stringing a large amount of messenger wire. Its messenger in one place is below the electric light wires about two feet in the clear and these wires have considerable slack. During a severe storm of wind, rain and lightning the electric light wire was swung against our messenger and caused a ground circuit which burned off about two inches of insulation and made a small mark on the messenger. The electric light circuit is 1100 volts A. C. 60 cycles. During this storm a team of horses was killed at the place the messenger is anchored to a slug. The horses were walking along the alley and when within about 8 feet of the slug they both dropped dead and it was noticed that they had entered a mud puddle, but the water did not connect with the anchor rod. The driver claims that when the horses were killed there was no lightning and that he felt a shock from the reins. Also a man wearing rubber boots attempted to wade in the mud puddle where the horses lay, and received a very strong shock. The horses showed no signs of being struck or coming in contact with a live wire. Over their heads about four feet were two telephone wires of another company, but these showed no signs of being struck.

Mr. M. W. Briggs, the manager of the company, is somewhat puzzled by the occurrence, and cites the following points, on which he would like to have advice from other telephone men:

The messenger being grounded thoroughly and carrying a current, as mentioned above, to ground, would there be any danger from a static charge accumulating and how would it discharge and kill the horses?

Is it possible the horses were killed by reason of the messenger being grounded?

Is it likely the horses were killed from lightning, or a static charge?

The editor would be glad to hear of other accidents to persons and horses under circumstances which approximately resemble those mentioned by Mr. Briggs in connection with replies to his questions. There have been many accidents of this character which have never been satisfactorily explained, and it might be a good thing to publish all that is known about them, and let people see how they resemble one another.

TAX ASSESSOR TAKES NOVEL PRECAUTIONS TO COUNT TELEPHONE POLES ACCURATELY.

WHILE the method adopted by M. W. Fletcher, county gravel inspector, who was employed by the turnpike board to count the telegraph and telephone poles in the county when the question of imposing a tax for each pole was introduced, can scarcely be called matchless, yet it is unlikely that any method as unique has ever been thought of, says a correspondent of the Memphis (Tenn.) News-Scimitar.

When given the task of counting the poles, Mr. Fletcher was

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They are Automatic—no Levers or Springs.

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FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Position as manager of office of about 1,000 or switchboard man of large office. Five years' common battery experience. Married; best references. Address Box 877, care of AMERICAN TELEPHONE JOURNAL, New York. 877

WANTED—A first class wire chief for exchange of 5,000 telephones, must be familiar with No. 1 Western Electric apparatus, can handle men and competent to make cable tests for trouble. Address, stating salary expected and experience. P. Kerr Higgins, Oklahoma City, Okla. 881

WANTED—Manager experienced in construction, operation, maintenance and business methods of both magneto and central energy exchanges, wishes position in a town of 5,000 to 10,000 as exchange manager. Good reasons for changing. Address Box 882, care AMERICAN TELEPHONE JOURNAL, New York. 882

WANTED—Position as superintendent or foreman of repairs or construction. Twenty-five years' experience with Bell and Independent companies. Best references; good reasons for changing from present position. Address Box 883, care AMERICAN TELEPHONE JOURNAL, New York. 883

POSITION WANTED—Young man twenty-three years old; four years on electrical engineering course; eight months drafting; six months wire chief; four months installation; six months circuit study; connection with small system preferred. Salary, $18.00. Address Box 884, care AMERICAN TELEPHONE JOURNAL, New York. 884

WANTED—A salesman, who travels and sells to operating telephone companies, to carry as a side line on a commission basis an article of great merit and with which a good man can do a big business. Address Box 885, care AMERICAN TELEPHONE JOURNAL, New York. 885

WANTED---Continued

WANTED—Position by first class cable splicer. Permanent position desired. References furnished. Address Box 886, care AMERICAN TELEPHONE JOURNAL, 934 Monadnock Bldg., Chicago. 886

WANTED—Chief operator to take entire charge of exchange having 2,500 subscribers; none but those capable of commanding the respect of operators need apply. State salary, experience and success obtained. Address Box 878, care AMERICAN TELEPHONE JOURNAL, New York. 878

COMPETENT man wishes position as telephone auditor or accountant, capable of going ahead with office detail or installing system, latest ideas, best of references. Address, Box 856, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 856

POSITION WANTED—Young man, 24, three years' experience in installation of P. B. X. switchboard, intercommunicating systems and interested in the trade; salary $21. Address Box 870, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 870

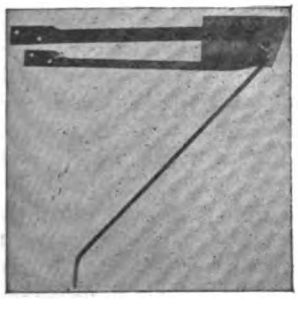
WANTED—Position with telephone company as maintenance or instrument man. Five years' experience. Best of reference. Address Box 867, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 867

WANTED—Position as wire chief or local manager in Middle West. Graduate of an electrical school; four years' experience as wire chief and switchboard repair man in central energy systems. Address Box 869, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 869

WANTED—Position as manager, contract agent or high class solicitor in the independent field by a thoroughly competent telephone man with twelve years' practical experience. Familiar with magneto and common battery systems. Now holding position as manager of three exchanges for an extensive independent concern. In present position two years. Salary to start $100 per month. Address, Box 874, care AMERICAN TELEPHONE JOURNAL, 100 William Street New York. 874

WANTED—Young men who are high school graduates and who have had one or two years' experience in telephone work, to enter our manual switchboard department and learn to wire toll boards, wire chief's desks, private branch exchanges, etc., for use in connection with our automatic systems. Call or write, Automatic Electric Company, Van Buren and Morgan Sts., Chicago, Ill. 868

SALESMAN—Wanted for Atlantic Coast States to sell Telephone Apparatus and Supplies. Must have selling experience, be familiar with exchange work and able to get business and hold it. State age, experience and references. Address Box 876, care AMERICAN TELEPHONE JOURNAL, New York. 876



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Made of 1½ inch angle iron painted with a weather-proof asphalt paint, to which is bolted a 1⅛ inch seasoned, creosoted pine seat.

Strong - Durable - Neat

Get our bulletin describing other specialties.

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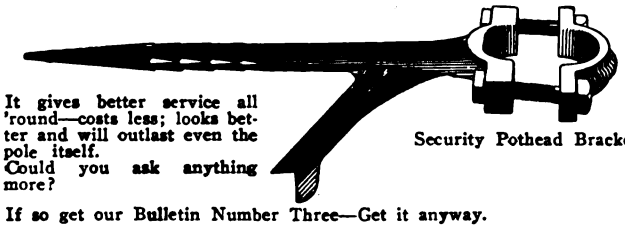
"WHAT AN IMPROVEMENT!"

That will be your first thought upon using the

SECURITY POTHEAD BRACKET



Security Pothead Bracket

It gives better service all 'round—costs less; looks better and will outlast even the pole itself.
Could you ask anything more?

If so get our Bulletin Number Three—Get it anyway.

THE F. BISSELL COMPANY

TOLEDO, O.

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rather at sea as to how to go about it without expending a great amount of time, and after much thought hit upon a plan by which he not only made an accurate count of the poles of each company, but recorded those poles which were improperly placed, that is, in ditches and those on the right of way.

Taking two large glass jars and a quantity of matches, he labeled the two former with the name of the two telephone companies and cut the matches in half, the headless portion to represent those poles which were properly placed and the other part to show poles which were in the ditches.

Thus equipped, Mr. Fletcher drove in a buggy over the county roads and in less than a day had completed the count. Returning home, Mr. Fletcher then counted the matches in each jar, and was ready to make a complete report.

The reporter says that it is the opinion of the members of the county court that Mr. Fletcher's method cannot be matched.

MORE INDEPENDENT LINES IN TENNESSEE.

THE Sumner County Home Telephone Company, with headquarters at Westmoreland, Tenn., C. W. Caldwell, manager, is extending its lines to Gallatin, Tenn., a distance of twenty miles. The company has just completed a line to Bethpage, Tenn., and has ordered for that place a switchboard which will be installed in the next few days. It also expects to install a plant in Gallatin just as soon as the poles and wire can be put up in that place, a job which will be completed within the next few weeks. This company now has connection with the Allen County Home and also the Central Home Companies, of Louisville, Ky., and is awaiting an opportunity to get connection with the city of Nashville, as soon as the plant of the Home company there is completed.

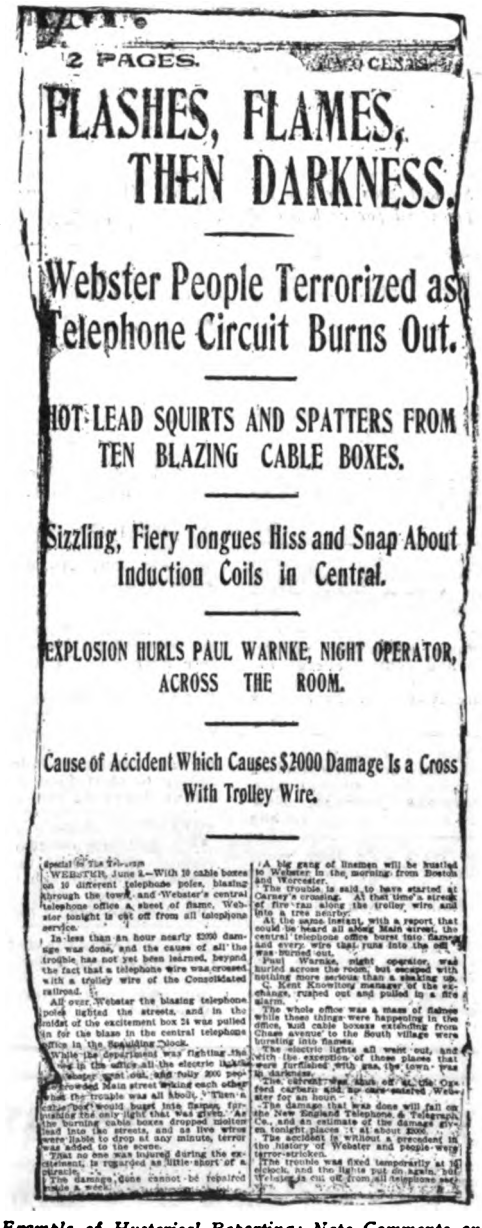
MONTANA COURT ORDERS PHYSICAL CONNECTION BETWEEN COMPETING TELEPHONE COMPANIES.

JUDGE HUNT, in the United States Court at Helena, Mont., has held that one company could not withhold the use of its lines from another, even though it be competing. The Montana & Wyoming and the Mutual Telephone companies applied to the court for an order compelling the Rocky Mountain Bell Telephone Company to furnish connections, when desired, at reasonable compensation. This was resisted on the ground that the lines were built for its patrons and not for those of competing companies. Extended arguments were made. Judge Hunt found for the complainants, and stated that he would soon name a commission to fix the division of charges when such use is made of connecting lines.

PLENTY OF GLASS FOR INSULATORS CAN BE MADE IN TEXAS.

CHARLES CLAYDON, of Kurten, Texas, has recently referred to opportunities for making insulators, as follows:

"I have just read Mr. Speed's article in THE AMERICAN TELEPHONE JOURNAL of July 13th, and notice that for building lines he says that Texas has all the materials except glass. Now, about four years ago there was a glass manufacturing plant put up at Houston, Texas, to make insulators, and another one at Anderson in Grimes County; in this county (Brazos) is the finest sand that can be found for making glass, and there is also good clay for the making of porcelain insulators. The raw materials can certainly be found in Texas by any one who wishes to use them."



2 PAGES.

FLASHES, FLAMES, THEN DARKNESS.

Webster People Terrorized as Telephone Circuit Burns Out.

HOT LEAD SQUIRTS AND SPATTERS FROM TEN BLAZING CABLE BOXES.

Sizzling, Fiery Tongues Hiss and Snap About Induction Coils in Central.

EXPLOSION HURLS PAUL WARNKE, NIGHT OPERATOR, ACROSS THE ROOM.

Cause of Accident Which Causes $2000 Damage Is a Cross With Trolley Wire.

Example of Hysterical Reporting; Note Comments on Page 73 of This Issue.

CHARGING OF FULL RATES DURING VACATIONS OF SUBSCRIBERS RAISES PROTEST AGAINST TELEPHONE COMPANY.

A NEW kick has been raised against the Cumberland Telephone Company in all the cities of its district in the South. Heretofore, in some cities a charge of $1 per month has been made in the past for telephones not in use, while in others no charge at all was made during the absence of the family in summer, because the telephone was not in service.

During the present summer, however, the company is demanding regular rates for the entire time, and if it fails to receive them it will take the telephone out. A bill for the entire time at full rates is being handed each subscriber on his return from the mountains or seaside. Louisville, Nashville, Memphis and New Orleans are the principal cities for the Cumberland company, and in these cities the exodus in summer time is great. Frequently five thousand families leave New Orleans in summer and often a thousand are out of the other cities named. Just about that many people are now abusing the Cumberland company.

LOW NIGHT RATES DEFINITELY ABANDONED IN CUMBERLAND TERRITORY.

LELAND HUME, general manager of the Cumberland Telephone & Telegraph Company (Bell), has issued the following self explanatory order, which applies to all the Cumberland's territory, Tennessee, Kentucky, Mississippi and Louisiana:

"To the Public: On and after August 1, 1907, the day rates on toll messages will apply at all hours, day, night and Sunday, to all points reached by toll lines of the Cumberland Telephone & Telegraph Company. Written messages will be accepted at the same rates and under the same terms and conditions as are offered to the public by the other telegraph companies, but for oral communications the regular day rate will be the tariff to be observed on and after August 1."

For some time past the Cumberland company has asserted that people have been taking advantage of the low night rates to hold back their business in the afternoon, and do their telephoning with a rush in the early evening. This tends to demoralize the service and causes financial loss.

It is expected that this order will create many disturbances among subscribers anxious to force the company to maintain its old rate. The result of the contest will be watched with great interest by telephone companies all over the country.

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Save their cost every Pull

This cleaner is absolutely flexible and consequently will go around bends. It is pulled through the ducts after laying and removes all dirt, cement and any jagged edges that would injure the lead sheath. Ample room between the leather washers for dirt prevents choking. New washers easily applied at any time.

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GEM SINGLE EYE GRIP

Decrease Cable Installation Expense

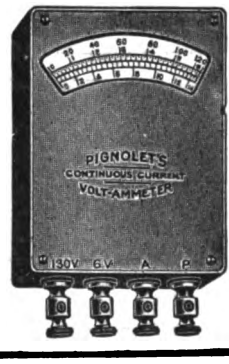
CHEAP VS. EFFICIENT SERVICE

The cheapest telephone service in the world is dear at any price if it is not efficient.

When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.



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All With The

"Patent Drip Petticoats"

The Hemingray-Glass Co., Office, COVINGTON, KY. Factory, MUNCIE, IND.

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The Practical Way

PROPER TEMPERATURE FOR PARAFFINE.—(893.)

In splicing cables where melted paraffine is used to "boil out" the cable, the writer understands that a certain degree of temperature of paraffine is too high for practical use, as it will so scorch the paper insulation and sleeves as to render them of little value. Will you kindly advise us how to determine when the paraffine is at the proper temperature for this purpose?
E. K.

The proper temperature of paraffine for "boiling out" paper insulated cable is 212 degrees F. As it would be rather inconvenient to carry a fragile thermometer about with them, cable men have adopted a very simple method for determining the proper temperature and one which does the trick very nicely.

When the paraffine is melted and at about what they think is the proper heat they either throw a few drops of water or expectorate into it, usually the latter.

If the temperature is high enough the paraffine will jump up and bubble when the moisture strikes it. You must learn how high it will jump, by experience. Should the paraffine be hot enough to scorch the cable, it will catch fire when the water strikes it, so it is therefore advisable to have a cover within reach when trying the experiment.

INDUCTION COIL CONSTRUCTION.—(894.)

Is there any definite electrical law involved in winding an induction coil for the highest efficiency of transmission? If so, what is that law; and what are the factors that enter into the calculation for the size of the wire, and number of turns of primary and secondary windings and the relation the factors bear to each other?
W. S. R.

No law governing the construction of induction coils is definitely agreed upon, as it would be impossible to construct a coil so that it would automatically adjust itself to all of the variations of a complete telephone circuit. First, there is the variation in capacity and resistance of the line; second, variation in central office equipment; third, variation in other instruments on the line; fourth, variation in the transmitters; and fifth, variation in the battery supply. Each manufacturer endeavors to construct a coil which will be best suited to efficiently co-act with his apparatus. This is one reason why an exchange will be able to give better service by using the complete equipment of one manufacturer.

Should a high wound coil be placed at one end of a line, and a low wound coil at the other, the person at the instrument having the low wound coil would hear better than the person at the instrument having the high wound coil.

No.	Number of turns on primary.	Size of wire.	Resistance.	Number of turns on secondary.	Size of wire.	Resistance.	Diameter of core.	Length of core.	Ratio of transformation.	Percentage of volume and clearness on five-mile line.	Percentage of volume and clearness on ten-mile line.
1	111	22	.39	5140	32	157	½"	4"	46	67	124
2	14	22	.14	2246	32	70	½"	2"	51	57	68
3	198	22	.62	2164	32	88	½"	2"	11	91	95
4	80	22	.27	2413	32	76	½"	3"	30	47	88
5	44	22	.09	2688	32	79	½"	2"	61	56	29
6	132	22	.36	2354	32	82	½"	2"	18	83	92
7	124	22	.24	1240	32	43	½"	3"	10	85	90
8	208	22	.54	1400	30	35	½"	4"	7	98	94
9	400	26	2.	1506	28	13	½"	4"	4	101	96
10	228	22	.52	900	36	58	½"	4"	3	95	72
11	400	26	2.1	1241	28	16	½"	4"	25	102	82
12	220	22	.48	5500	36	420	½"	4"	2	88	92
13	262	18	.99	420	22	2	½"	4"	4	92	74
14	400	26	2.1	1700	28	21	½"	4"	1.3	107	85
15	113	22	.40	554	22	1.75	½"	4"	5	61	57
16	371	28	3.5	2503	32	74	½"	2"	7	101	94
17	170	22	.56	2800	26	26	¼"	2½"	16	55	62
18	272	20	.35	2139	32	32	¼"	3½"	8	100	100
19	275	18	.88	2934	30	84	½"	3½"	11	100	88
20	275	18	.88	3910	30	217	½"	3½"	14	98	96

Table 894a.

In testing coils it is always best to use coils exactly alike, otherwise you will arrive at false conclusions. The results of a series of experiments conducted in the laboratory of one of the large manufacturers of telephone equipment is shown in Table 894*a*. The circuit arrangement of the apparatus used in these tests is shown in Fig. 894*b*. In these tests transmitters of three different manufacturers were used, each connected by a switch, in order that any one could be thrown in or out of the circuit. One coil was used as a standard, and all calculations made from it. Two circuits were built, and two duplicate sets of induction coils made. This apparatus was installed in two different rooms, in order that no sound should pass between the operators. An artificial line was placed between the two stations, having a division of five and one hundred miles. Experimental coils of the same kind would be placed in circuit at both ends of the line, and compared with the standard industion coil, the comparison

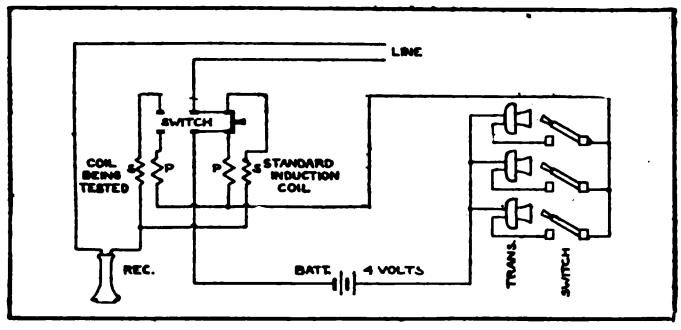

Fig. 894b.

being made by the man at the receiving end. Each man kept an account of his opinion as to the loudness and clearness of each of the three transmitters with the various coils. The figures shown indicate a percentage in comparison with the standard coil. This would make a percentage of volume of each of the three transmitters, and a percentage of clearness of each. The sets of figures of each man were then taken, and an average arrived at, and this average is the one shown in the table.

These experiments covered a long period of time, and were very tedious, and about the only conclusion arrived at was that the greater the ratio of transformation the better service the coil would give on long lines.

CROSS TALK THROUGH DROPS.—(895.)

We have a magneto board with drops which gives us no end of trouble from cross talk even with the lines in opposite directions. We cannot plug in on one line without hearing everything that is said on the other, the trouble being more pronounced in wet weather.

Our lines run through untrimmed trees and are metallic, but we do not believe that this is the cause of the trouble as we have found drops occasionally where lightning has gone through the insulation on the wire at the end of the core where the core is unprotected. Our protection against lightning is half ampere fuses and carbon arresters. Could not this trouble be overcome by thoroughly insulating the cores of the drops from the mounting frame?
E. L. I.

As there is evidently something seriously wrong with the winding of your switchboard drops we would advise that you take the matter up in detail with the manufacturer, who will undoubtedly appreciate having the fault called to his attention and be glad to rectify any fault in manufacture.

All of your switchboard drops are "common" at some point either through the cores or through the night bell circuit, and it is hardly possible to arrange them differently and still have them perform their different functions. As the cores are all "common" it would be advisable to clear all of the coils of trouble and keep them in that condition as nearly as possible. The great trouble in cases of this kind is that a man clears all cases of trouble, but perhaps one or two which do not cause him trouble until he gets lightning. We would suggest that you examine the ground connection on your protective apparatus and assure yourself that it is perfect, as the only positive way in which you can protect your exchange and subscribers' equipment against lightning is by providing an easy path by which the lightning may reach the ground.

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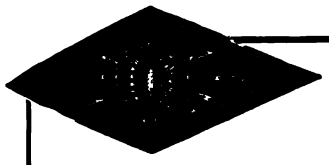
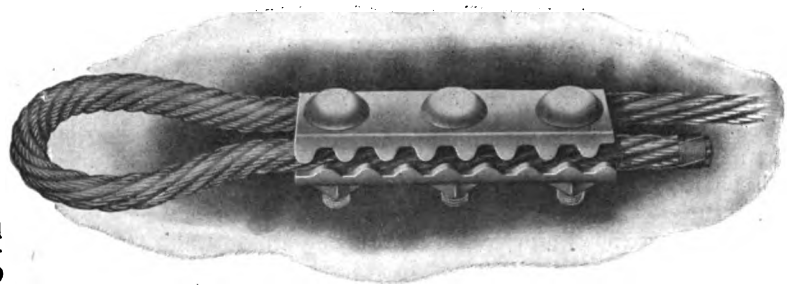


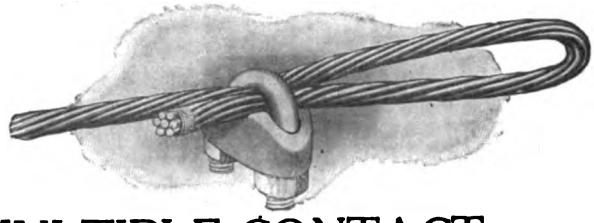
UNIVERSAL GUY CLAMPS



COOK'S UNIVERSAL GUY CLAMPS hold MORE THAN TWICE AS MUCH as any other clamp. ONE Universal can be used in place of TWO of any other kind—consequently they cost half as much. They take any size strand from 3-16 to ½ inch. It is unnecessary to carry an assortment of sizes in stock. Made of heavy malleable iron castings; thoroughly galvanized, assembled by hand—the nuts will not stick.

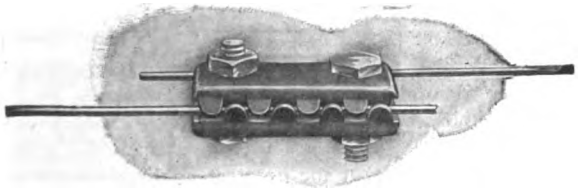
Price--One Bolt, 8c.; Two Bolt, 12c.; Three Bolt, 15c.

"U" BOLT CLIPS



Like the Universal Clamp Cook's "U" Bolt Clip will hold TWICE AS MUCH as any other of this type on the market. Costs less, too. Made of best material, galvanized and assembled by hand.

Price--8c. each.



MULTIPLE CONTACT TEST CONNECTORS

From the construction of these test connectors many points of contact are assured—a feature impossible to secure with the solid connector. TYPE OO Connectors will take any size wire from No. 6 to No. 22. Made for either copper or iron wire. Lock nut on bolt.

Price--One Bolt, 5c.; Two Bolt, 10c. **Write for Discounts.**

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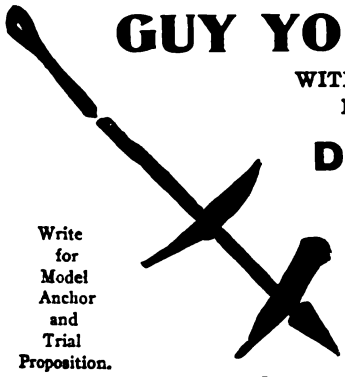

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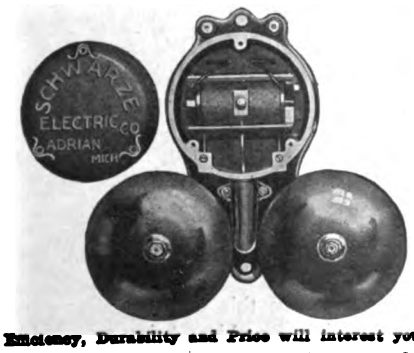

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Digest of Recent Patents

ADJUSTABLE TELEPHONE STAND.

W. B. Oliver, Collingswood, N. J., patent 858,822, July 2, 1907, assigned to Oliver Mfg. Co., Philadelphia.

The device described in this patent comprises a telephone support mounted so as to be adjustable to any desired position and so balanced by springs contained within as to remain at any point of adjustment.

On the upper end is provided an overhanging arm to which is secured the telephone transmitter. In the side of the support, below the transmitter arm, is provided a suitable receiver hook support and switching arrangements for suitably opening and closing the line circuit.

ELECTROTHERMAL DEVICE.

C. E. White, Chicago, patent 830,391, Sept. 4, 1906, assigned to F. B. Cook.

The device described in this patent comprises a hermetically sealed chamber containing a coil of high resistance and heating power. There is also a shifting medium such as a metallic diaphragm or a body of mercury, arranged to be subject to the pressure of the air in the chamber when expanded by the heat resulting from the passage of an abnormally strong current through the heat coil.

This movement opens or closes contact points as desired.

INSULATOR SUPPORT.

C. L. Peirce, Jr., Chicago, patent 856,488, June 11, 1907, assigned to Peirce Specialty Company.

The device described in this patent comprises a channel bar support slotted at the ends in such a manner as to enclose the ends of a coiled wire which is so shaped as to form threads upon which the insulator may be fastened.

ARMY TELEPHONE.

W. W. Lovett, Los Angeles, Cal., patent 858,611, July 2, 1907.

The device described in this patent consists of the coupling of two reels with revolving commutators and brushes together to two telephones in such a manner that they may be used for military field purposes.

GUY ANCHOR.

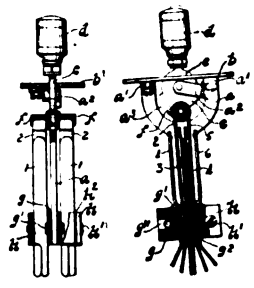
C. E. Cook, Chicago, patent 825,587, July 10, 1906, assigned to F. B. Cook.

The anchor described in this patent comprises an auger-shaped disk mounted together with two extension blades on a bar to which is attached the guy strand. The anchor is bored into the earth by turning the entire device in one direction and when it has been inserted to the proper depth the device is then turned in the opposite direction, causing the extension blades to assume a position at right angles to the supporting bar.

SWITCHBOARD KEY.

H. L. Knight, Cleveland, O., patent 860,874, July 23, 1907; assigned to Century Tel. Const. Co., Buffalo, N. Y.

In the key described a central supporting frame *a* formed of



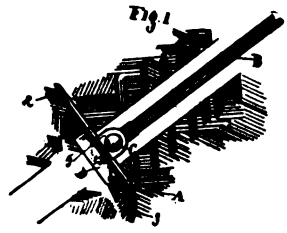
a single metal stamping is employed for the mounting of all of the working parts as shown, of which *d* is the key handle, *c* the rocker arm bearing the roller *f*, which controls the position of the springs 1, 2, 3, 4, 5 and 6 for the opening or closing of circuits.

The object is to provide a method of construction of keys in which the space required on the key shelf may be lessened, the number of parts reduced and all parts be readily acessible.

GUY ANCHOR.

C. E. Frost, Cleveland, O., patent 859,650, July 9, 1907.

In the anchor described in this patent *A* is a substantially flat metal body provided with an eye through which the lug *C* of the rib *D* extends.



The end 2 is pointed and is the end first inserted in the hole. The end 3 is bent outwardly so as to engage with the earth at the sides of the hole when an upward pressure is exerted on the cable *B*, causing the body *A* to be pulled into a position at right angles to the cable *B*, so that the greatest holding surface may be obtained.

ELECTRICAL PROTECTIVE DEVICE.

C. E. White, Chicago, patent 838,066, Dec. 11, 1906, assigned to F. B. Cook.

In this patent is described a tubular air cartridge provided with a resistance wire, which during the passage of excessive current, heats and causes the air to expand sufficiently to move a diaphragm which opens the circuit, thus stopping the flow of current.

The device is self-restoring, in that, when the air has cooled and contracted the diaphragm again closes the circuit.

TELEPHONE SWITCH.

T. S. Mount, Rhome, Tex., patent 851,994, April 30, 1907.

The device described in this patent comprises a V-shaped slot in the telephone box together with a rider mounted upon the receiver hook of a series telephone in such a manner that when the receiver is removed from the hook, the portion of the line upon which communication is not desired is automatically short circuited, thus allowing the instrument to communicate with persons on the other portion of this line as desired, and leaving the balance of the line in such condition that other persons on that portion may make use of it even though instruments beyond are in service.

PROTECTED SWITCHBOARD.

F. W. Wood, Newport News, Va., patent 859,276, July 9, 1907, assigned to C. and J. M. Cory, New York.

The switchboard covered by this patent comprises one in which the construction is such as to render it particularly adaptable for use on shipboard or other places where it might be subjected to moisture. The board is of the cordless type, all connections being made with keys of the double throw type.

TELEPHONE SYSTEM.

A. R. Kahl, Rochester, patent 853,304, May 14, 1907, assigned to S. C. Telo. Mfg. Co.

The invention described in this patent relates particularly to automatic selective ringing, its object being to provide improvements in the matter of selective ringing keys provided with locking arrangements whereby the position of the keys is governed by the answering or non-answering of the party called.

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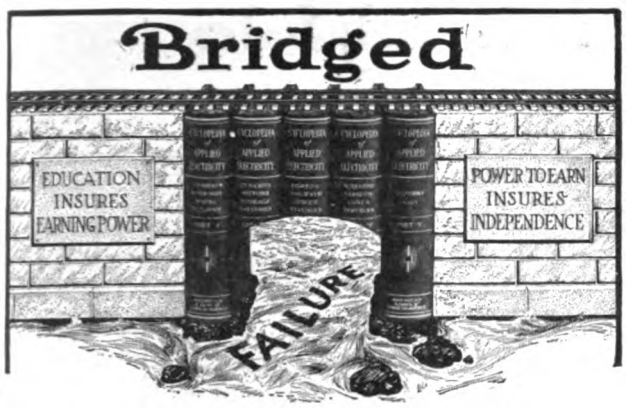

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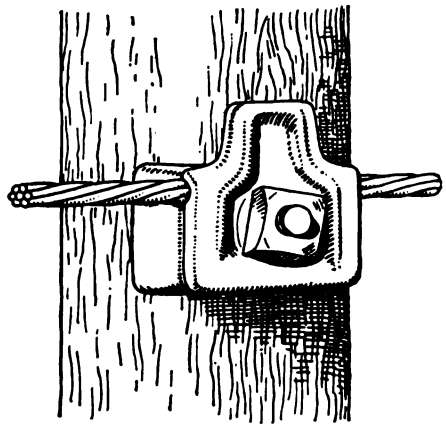

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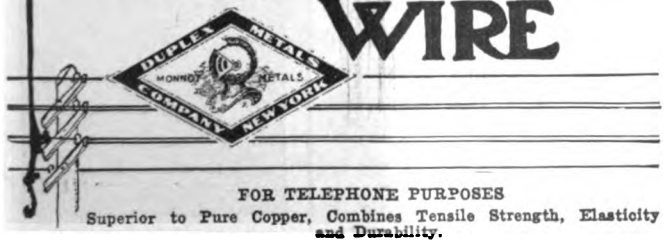

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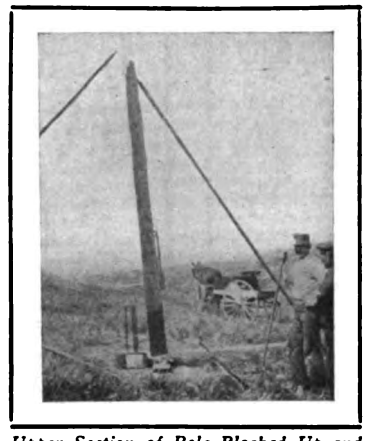
New Telephone Products and Sales

CONCRETE STUBS FOR TELEPHONE POLES.

DECAY in telephone poles, as is well known, takes place in the first instance near the ground line. For some years past various persons in several different parts of the country have experimented with methods of replacing the decayed portion with a stub, and fastening it securely to the upper sound portion of the pole. M. H. Murray, of Bakersfield, Cal., has invented a concrete stub which offers a very practical arrangement for this purpose. The pole is to be sawed off at a proper distance above the ground, and supported while the base is removed and the new concrete stub is inserted and thoroughly tamped. The wooden pole is then set in place and securely fastened by bolts and the iron work shown in the diagram.

Pole Raised to Prepare for Inserting New Base.

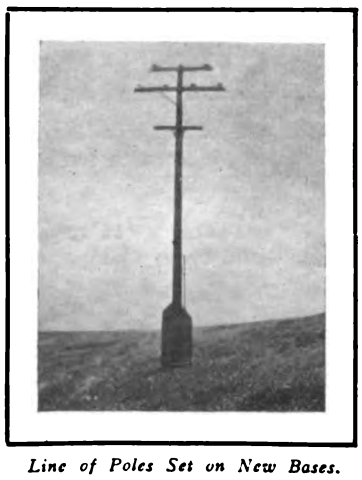
Mr. Murray states that he has replaced defective sections of poles very cheaply, the actual work after the concrete poles have been made requiring only two men and a team, and no high priced skilled labor being necessary. The accompanying photographs show various stages of the process, a pole being cut off about three inches above the surface, and the concrete stub inserted so that its top will reach this height, and thoroughly tamped in place. Holes in the wooden pole are bored after it is in place between the clamping irons, so as to obtain an exact fit, then the bolts are inserted, and the job is complete as soon as the nuts are drawn up tight. Mr. Murray states that two men installed five stubs per day of eight hours in rocky ground, and says that if the stubs were distributed beforehand these two men could install one per hour or better. The poles of the size adopted by the Power, Transit & Light Company of Bakersfield weigh 400 lbs. each, and the cost is comparatively low. Full particulars may be obtained by writing to Mr. Murray.



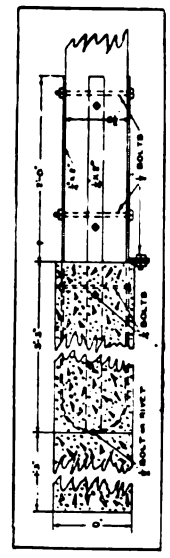
Upper Section of Pole Blocked Up and Supported.

ECONOMICAL WIRE FOR SUBSCRIBERS' DROPS.

DUPLEX copper wire of sufficient size to stand the stresses that are likely to be put upon it is at the present time very little used as a drop wire from distributing points to subscribers' stations. The companies which have used this wire in the past are looking for an acceptable low-priced substitute. Iron wire used for this purpose must have a very satisfactory insulation in order to prevent deterioration at a rapid rate, but the Durant Electrical Supplies Company, 59 Fifth avenue, Chicago, Ill., offers for this purpose a wire designed especially for use in subscribers' drops, known under the trade name of "Ironite." This is a rubber covered duplex wire, carrying a high grade insulation, with a very closely braided envelope of cotton on the outside. The company states that it is prepared under especially rigid specifications, all material being of first quality. The cotton covering is closely braided, affording excellent protection against the weather. The high tensile strength of Ironite as compared with copper is an advantage in respect to durability and appearance as well, as the wire will not stretch, while the conductivity of the Nos. 16 and 18 gauge wires used is amply sufficient for all practical purposes. The company will be pleased to furnish detailed information concerning the quality of this wire, and prices, as well as statements of the practical advantages which come from its use, to interested persons who write for these facts.



Line of Poles Set on New Bases.



The Murray Pole Base.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., has just received from the printer a revised issue of its Bulletin No. 19. This bulletin, which has been rearranged and much improved in appearance, describes bridging telephones and includes very many desirable types of instruments, among which may be mentioned the central energy style dry battery wall telephone, which is of particularly interesting design. The information in this catalogue is very complete, and is so presented as to be not only interesting and informing, but to have a very attractive appearance.

THE CENTRAL TELEPHONE AND ELECTRIC COMPANY, main office and factory, St. Louis, Missouri, is mailing to its friends a souvenir certificate, which, when accompanied by an order for telephone apparatus, supplies, or construction materials, entitles the holder to a pack of very finely finished enameled "Shield Emblem" playing cards.

The company sends a pack of these playing cards, postage paid, to all who comply with the conditions, which are made very simple. These cards represent a novel advertising effort, and are well worth having, so that many telephone managers and superintendents are taking advantage of the offer. Certificates may be obtained by writing to the company.

WESCO SUPPLY COMPANY, St. Louis, Mo., devotes special attention in a four page folder to "American" fuses and protective apparatus. Several types of fuses are shown, and a variety of substation protectors, adapted to use on rural lines and every other type of instrument installation. This folder will be cheerfully sent to interested persons on receipt of a request.

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Pole in Place on Concrete Stub.

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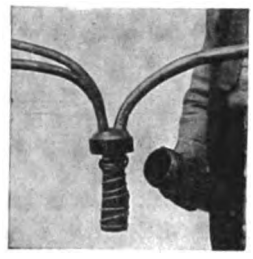

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By B. C. Bean, in "System."

It is safe to estimate that a majority of the people who read magazines look through the advertisements before going to the reading matter; it is also safe to say that eighty per cent of these find something in the advertising pages that appeals to them directly. They all intend to write asking literature, but not over fifty per cent ever do; the others either forget about the matter entirely or when they go to look it up fail to remember where they saw it. They made no note at the time, feeling that it would be an easy matter to refer to the book they saw it in; in the meantime the magazine has been lost or given away, and both the reader and manufacturer have lost.

An easy way to prevent all this trouble is to have an old copy of some magazine on your desk with the pages indexed from A to Z, and little subdivisions to help fill details. When some ad is found that interests cut it out and slip it in the proper alphabetical place according to the article advertised in the book arranged for the ads. These ads are only for the day and are seldom wanted longer. This way of keeping them is inexpensive and handy, and fills the requirements.

Fig. 3.

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The WIRE and TELEPHONE COMPANY of AMERICA

ROME, N.Y.

In our ad. last week attention was called to our extension service Easophone Equipment. The Hand Telephone of this is as shown in Fig. 3. The handle is of the highest grade tungsten steel, embedded in moulded hard rubber, and is practically indestructible. This steel frame is the horseshoe magnet upon which the proper receiver and transmitter parts are mounted. The high efficiency in long distance work is to a great extent due to this feature. The magnet, at the neutral point or heel, is circular in form, and permits the transmitter cup to pass through the opening thus made, and by a clamp nut is permanently locked to the steel backbone of the instrument. The transmitter is of the most advanced and efficient type; the vibrating diaphragm has incased within it the front and rear electrodes and the carbon granules, insuring a perfect freedom of action amongst the particles whenever the transmitter is in use, thus preventing the transmitter from packing. The solid tripod bridge threaded on the outside permits the piston chamber to be both concentric with the rear electrode piston and perpendicular to the frame of the diaphragm. The large number of screws common to most transmitters are eliminated, and a corresponding degree of simplicity is obtained.

See ads. of July 22nd and August 10th, and write for Bulletins Nos. 101 and 102.

THE WIRE AND TELEPHONE CO. OF AMERICA

ROME, N. Y.

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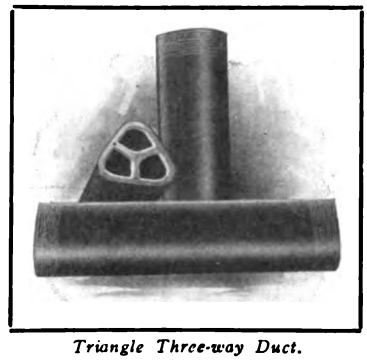
New Telephone Products and Sales

Landing, N. Y., is turning out a good quality of insulator pins and brackets. It is prepared to furnish this material in standard form at short notice. Interested telephone companies can obtain prices and all other information desired by writing to Geo. G. Peck, the manager of the company.

ADVANTAGES OF TRIANGLE THREE-WAY CONDUIT.

TRIANGLE three-way conduit, manufactured by the Clay Product Company, Brazil, Ind., presents a number of important advantages for use in terminals or laterals, or other conditions where a three-way conduit is desired in a single trench. One of the important considerations which frequently determines its purchase is that for every 1,000 feet of trench a saving of 166 pieces is effected, owing to the fact that its truss construction makes it possible to manufacture it in three-foot lengths, the same as the four and six-way conduit. This not only enables its users to save in the cost of labor handling, but also in joining, dowel pins, etc.



Triangle Three-way Duct.

The company also calls attention to the saving effected in the trench and concrete envelope, which may be used with this type of conduit. The figures it gives to demonstrate these points state that this ware requires only a 15-inch trench, while the standard requires nearly 20 inches. It works out these figures for a thousand feet of trench to show a saving of about $.008 per duct foot based upon an estimate of 75 cents per yard for handling the 23 yards of soil which represent the difference in amount of excavation.

In addition to the saving in trenching the company claims an additional amount in favor of the three-way conduit of about $.016 per duct foot, owing to the fact that the concrete envelope required for the three-way conduit is about 100 square inches in cross section, while the standard three-way conduit requires 142 square inches. Other economies are attributed to its smaller weight per duct foot, which is the result of its peculiar shape, and lowers the cost to the consumer of freight, teaming and general handling. Another slight gain is effected in the matter of repaving on account of the smaller width of trench. The manufacturer has received reports from companies which have used this class of ware, and their contents indicate that the use of Triangle conduit has enabled them to save between two and three cents per duct foot on finished work.

More detailed information as to the method of accomplishing this very desirable result can be obtained from the Clay Produce Company by those who contemplate putting in underground cable.

THE NEW STERLING HEAT COIL.

THE Sterling Electric Company, Lafayette, Ind., has not made a practice of using self-soldering heat coils in connection with its individual station and central office protection, consisting of main racks and terminals, and has confined the heat coil business to a coil which it has found to have stood the test of time and been satisfactory to all users. Believing that a non-combustible and renewable coil would be an improvement and acceptable to telephone users, after a long period of experimenting and exhaustive tests it has produced a coil which is interchangeable with the coil which it has been putting upon the market for years.

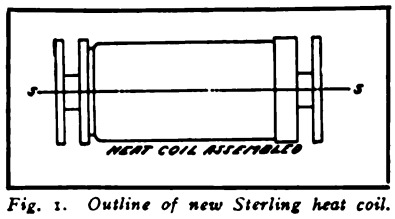


Fig. 1. Outline of new Sterling heat coil.

This coil is an all metal coil, consisting of metal heads and metal barrel, one head being permanently fastened to the barrel, but insulated with mica therefrom. One end of the coil upon the resistance spool is soldered to the head at the end opposite the barrel carrying the resistance spool, the other end of the coil being permanently attached to the barrel. The head of the coil is soldered to the barrel with 160° solder and operates with .3 ampere of current in 25 seconds, thus preventing any current which would damage the interior wiring of the apparatus from passing to either the central office equipment or the telephone.

The coil can be repaired either with current or with artificial heat. It can be restored to operative condition several times without destroying its efficiency by simply setting the head in place upon the barrel, and holding it in place with a pair of pliers while applying artificial heat to the barrel. This will at once resolder the coil and make it as good as new.

The coil, being all metal, is practically indestructible. These coils are made with 7½ ohms resistance. Fig. 1 shows an outline of the coil, while Fig. 2 gives the cross-section of the coil, showing its construction. It is believed by the Sterling Company that this coil will be an acceptable improvement to operating telephone companies. Further information will be furnished by the company.

"MILONITE" insulated nails are coming into extensive use for installing twisted pair wire in dry and accessible places, especially over wood work. The F. Bissell Company, of Toledo, O., which is distributing them, has recently issued a circular which calls attention to the following four points, which are commendable, namely: That they are easy to handle, prevent short circuiting, the color matches wire or wall, and the wire can be taken down without cutting or injuring insulation. Full particulars, samples, etc., may be obtained by writing to the company.

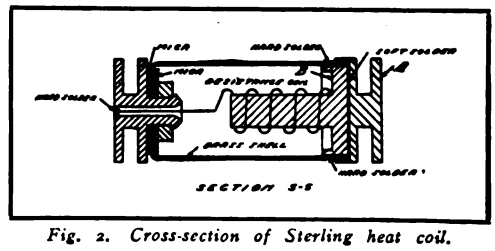


Fig. 2. Cross-section of Sterling heat coil.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Conn., in the July number of its interesting paper, designated as Trumbull *Cheer,* has some first-class paragraphs about advertising and other things. It also calls attention to the size of the Trumbull plant for the manufacture of knife switches, and gives pictures, descriptions and prices of several standard stypes of these switches. The company is extending its mailing list of this paper, and will add without charge the names of managers of telephone companies upon receipt of a request.

FRANKEL DISPLAY FIXTURE COMPANY, 740-742 Broadway, New York, reports that telephone companies are continually finding new uses for the well-known Frankel testing clip. The advantage of this clip over the old style suspender clip is that it may be easily and firmly attached to tinsel conductors, and secures a firm grip on any lug or small wire to which temporary attachment is to be made. The company will send full information and prices to those who are interested in this time-saving specialty.

FERGUSON LUMBER CO., Little Rock, Ark., manufacture and distribute yellow pine and cypress cross-arms. A good proposition for car load lots or less can be obtained by managers about to purchase this material.

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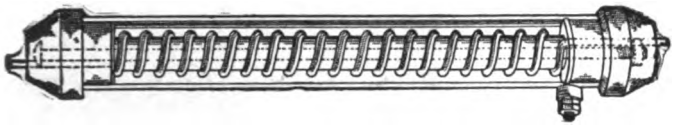
SKY ROCKET ARRESTER



In the Sky Rocket Arrester a 50-inch length of wire is built up into a succession of coils around a porcelain tube having a choking or reactance effect, and is surrounded by an iron cylinder to which is attached the ground wire.

When current of excessive potential, such as lightning, strikes the line wire it will not travel over this succession of coils into the telephone or switchboard. Instead it chooses the shorter path to ground, which is obtained by leaping the minute air gap between the discharge points of the wire helix and the grounded iron cylinder.

Commended by High Class Engineers

In a paper read before the American Institute of Electrical Engineers on "Protective Apparatus Engineering," Mr. E. E. F. Creighton says:

> **"Lightning arrester choke coils or reactances have the function of retarding high frequency lightning traveling toward the station. This retardation gives the lightning arresters time to relieve the lightning potential before it strikes the apparatus."**

SKY ROCKET ARRESTERS

represent the highest point in the development of choke-coil-reactance arresters. The fifty inches of coiled discharge surface always keeps the static charge below the striking point.

They have other good features, too. Let us tell you about them.

WRITE TO-DAY

Chance Manufacturing Co.
Centralia Missouri

Transmitter Test
For Line Efficiency

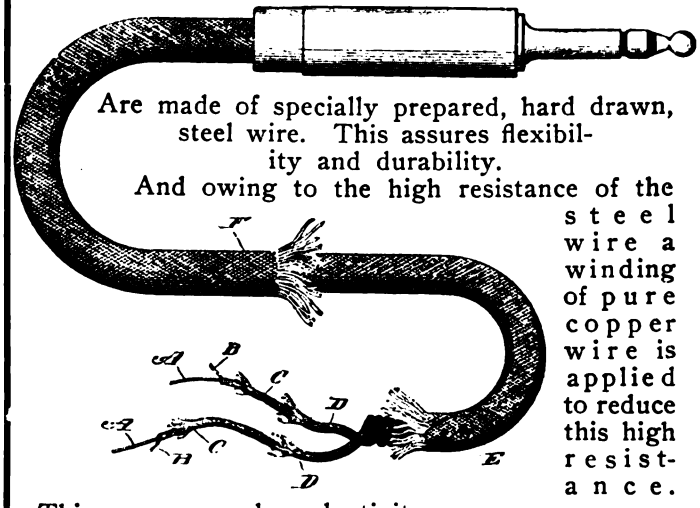
Disconnect the line, remove the receiver, wet two of your fingers and with them short circuit the two-line binding posts. Speak into the transmitter loud or low and note the sensation in fingers.

Now try it with a *"Long Distance"* transmitter, on the same telephone, and ***note the difference,*** which indicates the difference in line efficiency in the two transmitters. It's an interesting and *instructive* experiment.

We will send you a *"Long Distance"* transmitter for this purpose, to be returned if you do not like it. *But you will want to keep it.*

Long Distance Telephone Mfg. Co.
Makers of "Better" Telephones
SOUTH BEND, INDIANA

The Conductors or Premier BB Steel Cords



Are made of specially prepared, hard drawn, steel wire. This assures flexibility and durability.

And owing to the high resistance of the steel wire a winding of pure copper wire is applied to reduce this high resistance. This assures good conductivity.

Each conductor has a triple insulation, the first consisting of a serving of silk, the second of a serving of cotton and the third of a braiding of waxed cotton. These assure perfect insulation.

And these features, together with our new prices, which are in your favor, assure satisfaction to the purchaser.

It is to your interest to write us to-day

Runzel-Lenz Electric Mfg. Co.
97-101 South Clinton St., Chicago

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Important News—Briefly Told

NEW COMPANIES.

CALEDONIA, ARK.—Articles of incorporation have been filed by the Farmers' Independent Telephone Company, of Caledonia. It has an authorized capital stock of $3,000, and the incorporators are J. P. Hall, president; S. B. Tadlock, B. H. Spiers, C. C. Jones and J. J. Smith.

WILMINGTON, DEL.—The Newtown Telephone Company, which is located in this city, and which has a capital stock of $50,000, has been authorized to operate in Illinois, with a capital of $50,000.

CHARLESTON, ILL.—The Illinois Carrier & Telephone Company, of Charleston, with a capital stock of $1,000, has been incorporated by Henry McCabe, Frank P. Born and others.

GREENFIELD, IND.—The Stringtown Telephone Company has been incorporated at this city, and will construct, equip and operate a telephone system in Jackson and Center townships, Hancock county. Among the directors are Roy Crider, James Parish and Frank Carter.

ELLSINORE, MO.—The Farmers' Telephone Company, of Carter County, has been incorporated with a capital stock of $3,000, and expects to build lines between Ellsinore, Homestead, Williamsville and other places.

EGELAND, N. D.—Articles of incorporation have been filed by the Egeland Telephone Company, whose intention it is to construct lines which will connect with the Cando-Rock lines now in course of construction.

UTICA, S. D.—The Central Farmers' Telephone Company has filed articles of incorporation. It has an authorized capital stock of $25,000, and the incorporators are Lars A. Bruce, Edward Frank, George Muller and John Ulmer.

POMEROY, O.—The Pomeroy & Middletown Telephone Company, of Pomeroy, Ohio, with a capital stock of $50,000, has filed articles of incorporation. The incorporators are W. M. Cray, George Schlaegel, Charles McNamee, C. J. Schlaegel and J. W. McDonald.

LOOKEBA, OKLA.—The Farmers' Central Rural Telephone Company, which is to operate at Lookeba, Oney, Binger and Eakley, has been incorporated with a capital stock of $100,000. The incorporators are T. E. Green and M. N. Stewart, of Lookeba, and L. J. Walling, of Binger.

DRIPPING SPRINGS, TEX.—The Dripping Springs Rural Telephone Company has been incorporated with a capital stock of $10,000. Among the incorporators are E. H. Shelton, John E. Shelton and A. O. Sandbo.

HERBSTER, WIS.—A Farmers' Telephone Company is being organized at Herbster by George A. Howard, of Port Wing. Lines will be erected at this city, and connections eventually effected with Cornucopia.

TEMPRANCEVILLE, ONT., CAN.—Articles of incorporation have been filed by the King Telephone Company, Ltd. The capital stock is given at $10,000.

FRANCHISES.

MILFORD, N. Y.—A franchise has been granted by the village board of Milford to the Schenevus-Worcester Home Telephone Company, of Schenevus, and work on the installation of its system is to be commenced at once. This action has probably been brought about by the fact that, owing to the increase in rates by the Bell company, many people discontinued the use of its lines on April 1st.

BERTHOLD, N. D.—A franchise has been granted to Messrs. Russell and Gray to install a telephone exchange in this city.

HAMILTON, N. D.—Permission has been granted by the village council of Hamilton to the Citizens' Telephone Company, of Fargo, to construct and maintain a local and long distance telephone exchange.

TOWER CITY, N. D.—A franchise has been granted to the North Dakota Independent Telephone Company in this city, and it expects to install and maintain an up-to-date telephone system.

WASHBURN, N. D.—Permission to build lines in Washburn has been granted to the Max Telephone Company, of Max.

GILBERT, W. VA.—The Gilbert Telephone Company, of which John E. Stafford is president, and J. C. Elkins is secretary and treasurer, has been granted a franchise at this city.

ELECTIONS.

FULTON, IND.—The directors of the newly organized German Mutual Telephone Company are George Buhler, L. L. Sheets, F. Leiter, I. L. Babcock, B. Noftsger, George Brugh and John Mathias.

UNIVERSITY PLACE, NEB.—The officers of the local Independent Telephone Company are R. French, president; T. M. Wimberly, vice-president; H. M. Worley, secretary; and W. Smith, treasurer.

FINANCIAL.

SOUTH BEND, IND.—The directors of the South Bend Home Telephone Company have increased the capital stock from 2,000 shares of the par value of $100 each, to 4,000 shares of the par value of $100 each. The increased capital is to be spent in improving and extending the company's system.

DES MOINES, IA.—The Mutual Telephone Company, of Des Moines, Ia., has increased its capital stock from $450,000 to $1,600,000, of which $1,000,000 is common stock and $600,000 preferred, of the par value of $30.00 per share. This issue is for the purpose of taking over and consolidating five outlying mutual systems.

COBDEN, MINN.—The Cobden Telephone Company has paid a 12 per cent. dividend.

CENTREVILLE STATION, N. Y.—The officers of the Neversink River Telephone Company are: President, Ellsworth Baker, Hurleyville; vice-president, Lee V. Gardner, Centreville Station; secretary, Frank W. Laidlaw, Hurleyville; treasurer, Ernest W. Kinne, Centreville Station. The directors are: Ellsworth Baker, Hurleyville; Harrie McK. Curtis, Coxsackie; Frank W. Laidlaw, Hurleyville; Ernest W. Kinne, Centreville Station; Zodoc Winters, Centreville Station; Leo G. Laidlaw, Hurleyville; Lee V. Gardner, Centreville Station.

GOSHEN, N. Y.—The Warwick Valley Telephone Company has paid a dividend of $16.00 per share on its stock, making an average of four per cent. for all the years since the company started business.

MURFREESBORO, N. C.—The North State Telephone Company, of Murfreesboro, has filed articles of amendment to its charter with the Secretary of State, increasing its capital stock from $10,000 to $25,000. The articles of amendment were signed by L. J. Lawrence, president, and U. Vaughan, secretary.

CLEVELAND, O.—The capital stock of the Cuyhoga Telephone Company has been increased from $3,000,000 to $3,500,000 to permit of the issue of bonds.

BRUCE, WIS.—At a special meeting of the stockholders of the Chippewa Valley Telephone Company, it was decided to increase the capital stock of the company from $10,000 to $25,000. Plans are being considered for connections with the Farmers' Line running from Weyerhaeuser to Island Lake.

MISCELLANEOUS.

SAN DIEGO, CAL.—The San Diego Home Telephone Company has been reorganized with a capital stock of $1,500,000, divided into 1,500 shares of the par value of $100 each, and the following directors elected: L. J. Rice, J. W. Boyle, T. C. Hammond, W. A. Wallow and J. H. O'Brien, all of San Diego. It is the company's intention to construct lines from San Diego to National City; from San Diego to Oceanside; and from San Diego to Escondido, together with such other additional lines as may be necessary to take care of its business.

ASTORIA, ILL.—The plant of the Astoria Telephone Company has been acquired by George Elgin, of Woodland township, whose intention it is to greatly improve the system.

GALENA, ILL.—The lines of the Ogle County Telephone Company were damaged to the extent of about $1,000 during a recent storm.

LESLIE, MICH.—The Leslie Telephone Company, which has just installed a new switchboard at this city, has purchased the Wing lines and interest in the Henrietta exchange, and a controlling interest in the Rives exchange. The company is now completing a line into Jackson, and expects also to build a line connecting Munith, Stockbridge, Fitchburg and Bunker Hill with Leslie.

FARGO, N. D.—The lines of the North Dakota Independent Telephone Company were badly damaged during a recent storm.

WALHALLA, N. D.—A fifteen year lease of the Walhalla-Neche line has been secured by R. H. Corson, of Bathgate. He expects to put in new lines to connect with it from Leroy and other points between Walhalla and Neche.

ROSEBUD, S. D.—The Rosebud Telephone Company and the Gregory County Interstate systems have united, and will be operated under one management.

FT. WORTH, TEXAS.—The Home Telephone Company, of Weatherford, Texas, has become the property of the Southern Telephone Electric Company of Fort Worth, a company capitalized at $10,000,000, and chartered under the laws of Arizona. It will at once commence to greatly improve and extend the local service, and will also build long distance lines into the neighboring territory. The new company as now constituted com-

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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National Pole Company

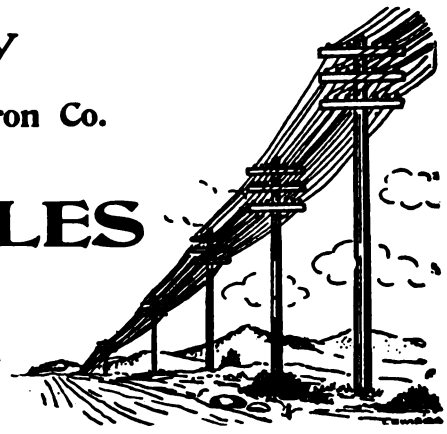
SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from
Maine to Washington



MICHIGAN WHITE CEDAR POLES

We have a large stock of White Cedar Poles of all sizes, concentrated at a point on the D. & M. R. R. in lower Michigan, from which we can make prompt deliveries. The location of this stock offers exceptional facilities for shipments to all points in Ohio, Indiana, Southern Michigan and the Eastern States. Write us for delivered prices on any size for immediate shipment.

KELLOGG SWITCHBOARD & SUPPLY CO.

CHICAGO, ILL.

Our Price is Right

1st TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.

Harrison and Clinton Sts., Chicago

The Lindsley Brothers Co.

PRODUCERS AND SHIPPERS OF

WESTERN CEDAR POLES

AND MANUFACTURERS OF

RED FIR CROSS ARMS

SPOKANE - - WASHINGTON

Eastern Sales Office: MONADNOCK BLDG., CHICAGO, ILL.

CEDAR POLES

LARGE STOCKS PROMPT SHIPMENTS

THE VALENTINE-CLARK CO.

ERNEST L. CLARK, PRES.

234 LA SALLE ST. CHICAGO.

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Important News—Briefly Told

prises W. D. Carter, president; E. P. Sawtelle, vice-president; J. C. Casler, treasurer; J. N. O. Rech, secretary.

SPOKANE, WASH.—The local Interstate Telephone Company of Moscow has been absorbed by the Interstate Telephone Company of Spokane. The purchase of the Moscow lines gives the Interstate Company a line into Lewiston, and connections with the Nez Perce prairie towns. It expects to establish up-to-date exchanges in all the towns upon its lines as quickly as possible.

TORREON, MEXICO.—The two local telephone companies, owned respectively by Mr. Woesner and Mr. Sepulveda, are to be taken over by local capitalists, whose intention it is to consolidate the exchanges and build lines into the surrounding country.

PERSONAL.

E. O. ARNOLD, who has been chairman of the executive committee of the board of directors of the Mt. Vernon Telephone Company, Mt. Vernon, O., has just been appointed general manager. This is a position which has for some time been vacant, and Mr. Arnold will take full and active charge of all departments of the company.

P. K. BAKER, general inspector of the Southwestern Telegraph & Telephone Company at Dallas, Texas, is to succeed Mr. T. L. Powell as superintendent of the Little Rock Division of the Company.

B. F. HEMENWAY has been appointed manager of the Montpelier, Vt., exchange of the New England Telegraph & Telephone Company.

F. C. LEWIS, formerly superintendent of the Denison, Texas, exchange of the Southwestern Telegraph & Telephone Company, has joined the engineering staff of the Home Telephone Company, of Los Angeles, Cal.

T. L. POWELL has recently been appointed assistant general superintendent of the Southwestern Telegraph & Telephone Company, with headquarters at Dallas, Texas.

B. W. TRAFFORD, who has lately held the position of general manager of the Chesapeake & Potomac Telephone Company, has recently been elected general manager of the Michigan State Telephone Company, and will assume active performance of his duties at Detroit, Mich., September 1st.

T. G. WILKINS has recently been appointed manager of the exchange of the Southwestern Telegraph & Telephone Company at Denison, Texas.

A. C. WITTE has recently assumed the duties of superintendent of the Coos Telephone Company, with headquarters at Lancaster, N. H.

Progress of the Builders

CONSTRUCTION.

RUDY, ARK.—A rural line from Rudy to Van Buren is being constructed by the Farmers' Union Telephone Company.

BERKELEY, CAL.—It is estimated that about $60,000 is to be expended by the Home Telephone Company in the construction of its new exchange building.

MINIER, ILL.—New lines are being erected by the Minier Mutual Telephone Company.

VERMILION GROVE, ILL.—Work on its system is being conducted by the Citizens' Telephone Company. A line has been erected to Ridgefarm, at which place a switchboard has been installed; and it is also the company's intention to build lines to Humerick, Indianola and Chrisman.

ANGOLA, IND.—The Taylor Telephone System, of which J. L. Taylor is president, and which covers Steuben county, and connects with other counties, contemplates the erection of a new toll line between Angola and Auburn. It will have the cooperation of the Home Telephone Company, of Auburn, in this work.

AUBURN, IND.—Among the many improvements being made by the Home Telephone Company is the installation of a new switchboard. From present indications it will be necessary to install an additional board very soon to take care of the company's increasing business.

MICHIGAN CITY, IND.—New lines are being erected by the Merchants' Mutual Telephone Company at this city.

OSSIAN, IND.—Many improvements in its system are being made by the United Telephone Company in Ossian.

ARGYLE, IA.—A new exchange building is to be erected by the Big Four Telephone Company in this city.

EUREKA, KY.—The Eureka Telephone Company expects to establish an exchange in Corydon, where connections will be made with the Home Telephone Company, of New Albany.

BRIMLEY, MICH.—Work on the construction of its system is under way by the local Independent Telephone Company.

ISHPEMING, MICH.—Work on the reconstruction of its system at this city is to be commenced by the Marquette County Telephone Company. It will install a new switchboard, and remodel its plant in such a manner as to make it thoroughly up-to-date in every particular.

LAINGSBURG, MICH.—About $8,000 has been expended by the Laingsburg Telephone Company in the improvement of its system, and other extensions are being considered.

LANSING, MICH.—Among the many improvements planned by the Citizens' Telephone Company is the erection of a new exchange building at this city.

MARSHALL, MICH.—The lines of the Citizens' Telephone Company are being extended.

STURGIS, MICH.—A number of new rural lines in the vicinity of Sturgis are being erected by the Independent Telephone Company.

MANKATO, MINN.—Among the improvements being made by the Mankato Citizens' Telephone Company is the erection of a line into Judson. The company is also considering the advisability of establishing an exchange at Madison Lake.

MARIETTA, MINN.—New lines south of this city are being constructed by the Marietta Telephone Company.

MEMPHIS, MO.—The Memphis Telephone Company is making many extensions and improvements in its lines.

PLYMOUTH, N. H.—The lines of the Baker's River Telephone Company are being extended from Plymouth to Campton Village, a distance of nine miles. Lines are also to be built to Woodstock and Lincoln.

TEXICO, N. M.—The Roosevelt County Telephone Company, which has headquarters at this city, and which owns exchanges at Portales, N. M.; Farwell, Texas; Texas, N. M.; Clows, N. M.; Melrose, N. M.; is constructing an exchange at Blacktower.

ANTLER, N. D.—New lines are to be constructed by the Loop Mutual Telephone Company.

CANDO, N. D.—The Farmers' Telephone Company contemplates the erection of a line from Cando to Egeland, thence to Rock Lake, Ellisberry, Armourdale and Hansboro.

CRETE, N. D.—It is the intention of Hample Crete Telephone Company to extend its lines from Crete to Stirum.

HENSEL, N. D.—The Home Improvement Telephone Company is establishing a local exchange at this city.

LANSFORD, N. D.—The Farmers' Telephone Company is extending and improving its system. Among the new lines being built is one west from Lansford, and a line southwest of the city is also to be built.

PINGREE, N. D.—The North Dakota Independent Telephone Company, which acquired the Pingree Telephone Company some time ago, is installing an up-to-date exchange in this city.

COLUMBUS, O.—Work on the branch exchange of the Columbus Citizens' Telephone Company is nearing completion.

NORTH BENTON, O.—New lines out of North Benton are to be erected by the North Benton Telephone Company.

WELLINGTON, O.—Among the many improvements planned by the Wellington Telephone Company is the installation of a new switchboard capable of accommodating more than one thousand telephones.

CONNELLSVILLE, PA.—The Tri-State Telephone Company, which recently became the property of the American Union Telephone Company, is to have its system greatly improved.

EAU CLAIRE, PA.—The lines of the Eau Claire Telephone Company are being extended in many directions.

BRENHAM, TEXAS.—The Brenham, Greenville & Shelby Telephone Company has built a line from Greenville to Shelby, and expects to still further improve its system.

PALESTINE, TEXAS.—The Palestine Telephone Company is at work on its new exchange in this city. When it is completed the company expects to have a thoroughly up-to-date plant.

STOCKDALE, TEXAS.—A telephone system is being built by the Farmers' Union in the rural districts.

OAKSDALE, WASH.—A new telephone line is being constructed by the Thorne Creek Farmers' Telephone Company, to connect with the long distance lines at this city.

ARCADIA, WIS.—A new central office has been established by the Tamarack Farmers' Telephone Company at this city.

CARY, WIS.—A line between Caryville and Brunswick is to be erected by the Caryville Telephone Company.

ELMWOOD, WIS.—Many improvements and extensions in its system are being made by the Woodhull Telephone Company.

MONTICELLO, WIS.—The United Telephone Company has been making many improvements in its system at this place. New lines are also to be built through Mt. Pleasant and other places.

OSCEOLA, WIS.—Considerable additional construction work is planned by the Osceola Farmers' Mutual Telephone Company.

RIPON, WIS.—A new switchboard is being installed by the Ripon Telephone Company.

SHEBOYGAN, WIS.—A new switchboard is being installed by the Citizens' Telephone Company at this city.

UNDERGROUND.

MIDDLETOWN, O.—The Home Telephone Company is to place some of its wires underground in this city.

APPLETON, WIS.—The city council is considering the advisability of compelling all telephone companies to place their wires underground.

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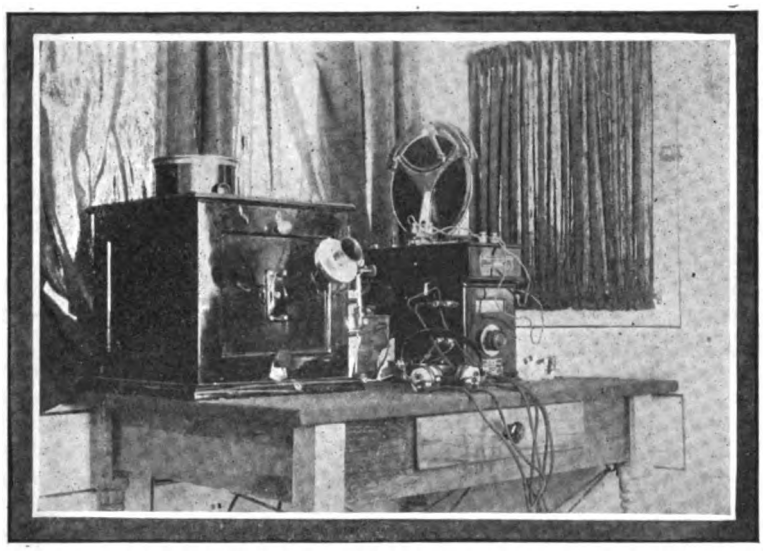
Wireless Telephony Proven a Commercial Possibility

By Lee De Forest.

REPORTING the features of yacht races from a moving boat to the shore by wireless telephone apparatus would seem to give a conclusive test of the practicability of using this method of communication.

What the writer believes to be the first actual application of wireless telephony to practical work anywhere in the world was made at Put-in Bay, in Lake Erie, during the week July 15 to 20, in reporting the regatta of the Interlake Association. The writer and his assistants employed by the Radio Telephone Company installed a wireless telephone outfit on board the cruiser yacht "Thelma," owned by Commodore W. R. Huntington, of Elyria, Ohio, and also equipped a shore station at the Fox Dock at Put-in Bay.

Although not perfectly suited to the task on account of her short spars and wooden hull, the "Thelma" enabled excellent results to be obtained with the wireless apparatus throughout the entire regatta. The distances which were attained even exceeded the hopes of those in charge of the apparatus. The "Thelma" followed the competing yachts, or motor boats, around the course through most of the races and accounts of occurrences during the races were telephoned to the shore station exactly as the events occurred. Not only was speech transmitted, but singing, whistling and gramophone music or dialogues were interpolated with the news reports. People on the yacht and ashore were surprised at the clearness and fidelity of the reproductions. Friends recognized one another's voices without difficulty. The scratching of the gramophone needle over the disc after the record had been played through, even the tapping on the mouthpiece of the microphone transmitter with a pencil was distinctly heard at a distance of three miles from shore. The greatest distance at which the reports from the yachts were heard and recorded was four miles.



Station for Transmission and Receiving of Speech Without Wires, Installed on the Yacht "Thelma."

The electrical equipment of the "Thelma" comprised a 220-volt generator of one H. P. capacity, the De Forest oscillator and transmitter and for the receiving apparatus an Audion detector and "pan cake" form of syntonizer or tuner. Her aerial wires led through the roof of the wheel house to a small crossarm on top of the foremast and thence to a similar arm on the mainmast. Ground connection was at first made to the propellor shaft of her twin screws, but as this was found insufficient, more area was added by fastening two sheets of zinc to the yacht's hull at the bow.

"Thelma" is a trim little cruiser yacht of 17.82 tons net, length over all 72 feet, with 10 feet 8 inches beam and 5 feet draught. She carries two 20 H. P. Lacy engines and is schooner rigged. The telephone dynamo was belted direct to the flywheel of her starboard engine aft and the rest of the Radio apparatus was mounted on a small table in her main cabin, convenient to all.

On shore 110 volt direct current was available and this was transformed to 220 volts by a motor generator. This current was led through a rheostat and choke coils to the oscillator. Connected to this oscillator is a shunt circuit consisting of a condenser of peculiar construction and a primary coil, the exact number of turns of which could be varied at will to alter the tune or wave length of the electrical waves which were generated. A second coil within this primary had its upper end connected direct with the antenna or aerial wire, while its lower end led first through the microphone transmitter and thence to the earth plate.

As a sample of the actual service which the Radio telephone performed during the Put-in-Bay regatta the following synopsis of the report of the morning races of Friday, July 19, is given. The man in charge of the shore station was not a stenographer, so it was possible for him to write down only the first words of a conversation or brief headings of the reports. This illustrates incidentally the great advantage in point of expedition of business of the wireless telephone over the wireless telegraph. From three to four times the number of words can be transmitted in a given length of time.

"9:57½ A. M. I will tell you when the first boat crosses the line. First boat is about crossing the line—9:59. 'Spray' crossed the line at 9:59. 'Spray' crossed about 25 seconds after 9:59. Nine fifty-nine and 5 seconds is the exact time." (This was followed by gramophone music played on the "Thel-

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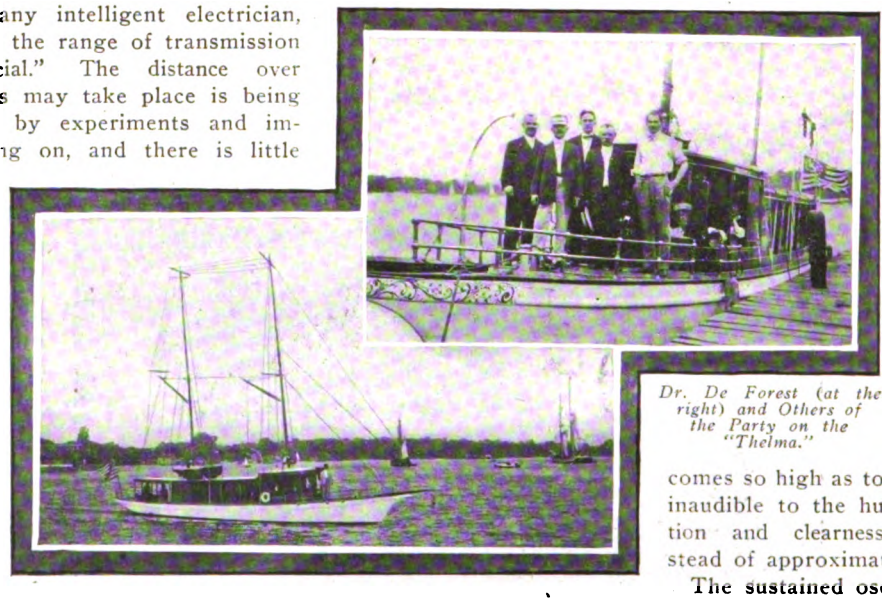
ma." Later—"Second boat just crossed, 10:07½. First in the catboat race crossed at 10:01½. 'Cleveland' finished second; time 10:03⅛; 'Borealis' 10:04¼. 'Cleveland' finished second. What shall I put down for you in the second race? 'St. Clair' just crossed, 10:07½ (repeated often). Hello, Frank! We will be back in about two hours. 'Osekita' just crossed the line; you spell it, I can't. Time, 10:08½, etc., etc.," until the races were finished and the "Thelma" started back for Put-in-Bay dock.

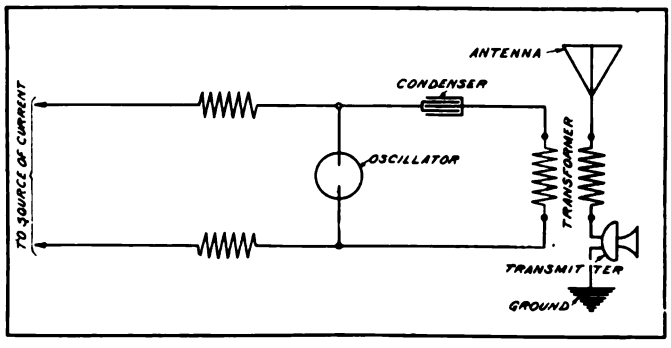
The success attending the work carried on during the regatta at Put-in Bay has served to introduce to the public apparatus which has been the subject of the writer's experiments and investigations for some time past. Methods originally described in a patent application filed by the writer in 1902 comprise to a large extent the system of radio telephony which has recently been demonstrated in New York City and, on a larger scale, on the Great Lakes.

Although the serious work of putting the system into commercial operation is of relatively recent date the success thus far attained is exceedingly gratifying. The experiments conducted in public have demonstrated conclusively that there has been developed a ready means of transmitting speech without wires, which is at once applicable to well-nigh every vessel. They have also made it clear that this result can be accomplished by an outfit which requires small space on shipboard. The apparatus is sufficiently simple to be operated by any intelligent electrician, mate or engineer and the range of transmission is already "commercial." The distance over which communications may take place is being continually increased by experiments and improvements now going on, and there is little doubt that a year from now it will be possible to talk by this system over a distance as great as that traversed by a large proportion of wireless telegraph messages.



Dr. De Forest (at the right) and Others of the Party on the "Thelma."

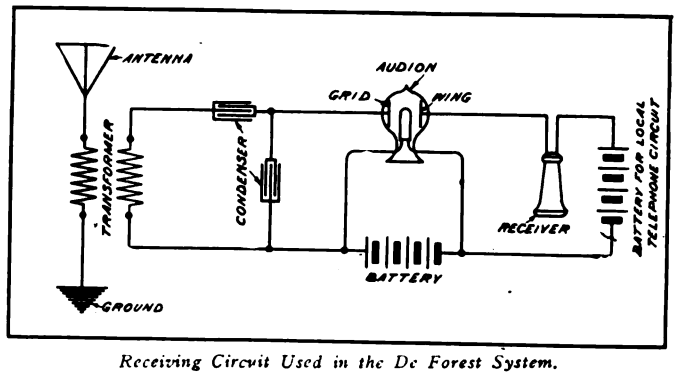
The system designed by the writer is based upon the modulation by an ordinary telephone transmitter of trains of electromagnetic waves of very high frequency. These waves may be generated in a variety of ways. Duddell, in papers now historic, disclosed the electrical analogue of the transformation of continuous mechanical motion into pulsating or alternating



Transmitting Circuit Used in De Forest Apparatus for Wireless Telephony.

movement, showing how from the continuous electrical current it is possible to obtain rapidly alternating currents, as in acoustics the bowing of the violin string produces rapid vibration of the string or the constant blast in an organ pipe produces the high-pitched note.

Poulsen described one method of increasing the frequency of the alternating currents produced by the Duddell arc until the rapidity of oscillation becomes so great as to enter the "hertzian" range, at which frequencies energy begins to be "broken off" from the aerial wires and radiates into space.



Receiving Circuit Used in De Forest System.

Other methods are equally or more efficacious than that of putting the direct current arc in hydrogen gas, but the principle of obtaining high-frequency alternating currents from a relatively low potential arc offers great advantages owing to its simplicity, low cost and wide range of applicability.

To adapt an arrangement of the low potential arc to wireless transmission of speech it is only necessary to secure a spark frequency exceeding the tones used in speech, but if this frequency be far higher, having, for example, over 40,000 alternations per second, so that the pitch of the aerial vibrations produced by the spark becomes so high as to make them altogether inaudible to the human ear, the articulation and clearness become perfect instead of approximate.

The sustained oscillations from the arc fulfil these conditions, but long and painstaking experiments have been necessary to render the arc quiet and free from the hissing or "popping" sounds which, if present, render the speech at the receiving station more or less "cloudy."

Given the continuous radiation of hertzian energy it remains to vary, not the frequency of the electrical oscillations, but the amplitude of the waves, in accordance with the sound modulations of the voice.

This is accomplished in a surprisingly simple manner, merely by placing a microphone transmitter in the earth lead, between the source of oscillations and the ground, at a point where the high frequency currents are maximum and the potentials are minimum.*

Located thus there is surprisingly little wear and tear on the microphone, at least for Radio telephone transmitters, up to one kilowatt capacity. The transmitter does not even require water cooling if of a self-ventilating type.

The receiver necessary to reproduce every fluctuation of the energy of the transmitter may be any of the various forms of automatically restoring "responders," using an ordinary telephone receiver as a signalling adjunct.

(*Continued on page 94.*)

*This arrangement and method of governing the character of the radiated energy by the minute vibrations of the microphone diaphragm is described in Pats. No. 836,015 and 836,072 issued to the writer.

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Talking and Telegraphing Simultaneously Over the Same Line

Article I—The Repeating Coil and the Simplex Circuit, Concluded

By N. C. Kissell.

CONDITIONS which would exist if the neutral points of the secondaries of balanced repeating coils at the terminals of a telephone line were connected together have been explained in connection with Fig. 2. A more perfect analogy with the state of affairs which exists in a simplex circuit used for transmitting telegraphic signals can be worked out by observing what takes place when a battery is connected serially in such a third wire, as shown in Fig. 3.

To make the clearest explanation of the electrical and magnetic phenomena which occur in the coil itself it is useful to refer to a diagram showing only the secondary winding on the iron core (Fig. 4.) If current is passed around this ring in the direction from *b* to *c*, the core will be magnetized and the magnetic flux will travel around through the core in the direction opposite to that taken by the hands of a watch. If current is passed from *c* to *b* the flux will travel in the opposite direction. If current is passed from *a* to *c*, through half the winding, the magnetic flux will travel around the entire core, as the magnetic circuit is closed, in the same direction as when the terminal is at *b* instead of *a*. If passed from *a* to *b*, the current will travel through the other half of the winding and create a magnetic flux in the iron core in the opposite direction. Now if *b* and *c* be connected together, and current be passed in at *a* and out at *b*, *c*, it will divide at *a*, part going through half the winding in one direction, and part going through the other half of the winding but in the opposite direction. This tends to create two opposing magnetic fluxes in the core, one winding setting up a flux in one direction, the other in the opposite direction. Both of these fluxes being equal (provided the number of turns and the resistance of both windings and their positions in relation to the core are exactly the same) they will neutralize each other, and consequently there will be no magnetic flux set up in the core and the windings act simply as a conductor. The magnetizing force of the current flowing through one coil in one direction is neutralized by the magnetizing force of the current flowing through the other coil in the opposite direction.

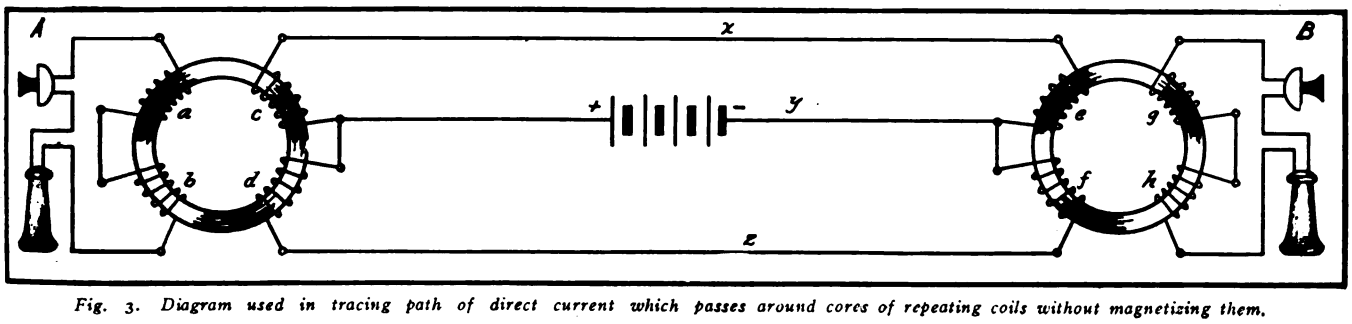

Fig. 3. Diagram used in tracing path of direct current which passes around cores of repeating coils without magnetizing them.

This is what happens when the battery is connected in series with wire *y* as shown in Fig. 3. Current flows from the positive pole of the battery to the point of connection of the windings *c*, *d*, and at this point divides, part going through winding *c*, wire *x*, winding *e* on the other repeating coil, and back to battery over wire *y*; the other part goes through winding *d*, wire *z*, winding *f*, and back to battery over wire *y*. The resistance of these two divided circuits must be equal; that is the resistance through winding *c*, wire *x*, winding *e*, wire *y* must be the same as the resistance through winding *d*, wire *z*, winding *f*, and wire *y*. When this is the case, the current will divide equally through the repeating coils, and be in opposition in the two sections of each coil, consequently the iron cores will not be magnetized. This condition is brought about in practice by winding the coils *c*, *d*, *e*, *f*, of the same resistance and number of turns, and using two line wires of the same resistance and properties.

The wire *y* being common to both divided circuits its resistance will not have to be considered. As the current divides equally over both line wires, the current in each wire will be the same. For instance, suppose there is .5 ampere flowing in each line wire and the resistance of the wire is 5 ohms per mile. Then for each mile of wire carrying this current, there will be a drop in potential of 5 times .5 ampere which equals 2.5 volts. As the current is flowing in the same direction in both wires and the drop along each wire being the same, there will then be no difference of potential across the two wires at any point and other telephone stations can be bridged across the line. Under these circumstances a second circuit can be made out of this telephone line without interfering with its use as a metallic circuit for transmitting speech and the new circuit thus obtained can be used commercially.

In Fig. 5 is shown a telephone line with repeating coils in the circuit. From the centers of these coils are taken taps which enter into a second circuit over the line wires. This circuit instead of going through an expensive wire (as *y*, Fig. 3) is completed through the ground. In this second circuit have been introduced two sets of telegraph instruments, thereby creating a grounded telegraph line in conjunction with the telephone line. In this way a telephone company makes a telegraph circuit without actually building the line itself, and doubles the earning capacity of its wires. The telegraph current will divide equally over both line wires and will not interfere with the talking circuit provided the conditions are such as have been explained.

The circuit of the telegraph being completed through the ground, and as the ground connections are at points distant from each other, there may be a difference of potential between

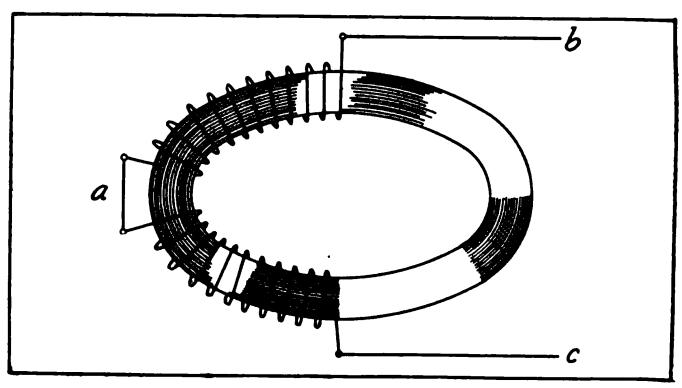

Fig. 4. Conventional diagram of repeating coil, with a single set of coils.

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the two grounds which will cause earth currents to flow over the line. The latter will therefore flow just the same as the telegraph current and will cause no annoyance in the telephone circuit. A 1 micro-farad condenser is placed in the Morse circuit as shown in diagram. The action of the latter is to take off the sharp edges of the Morse impulses or to round off their corners to a certain extent so the rise and fall of the telegraph current will not be so abrupt and consequently there will be a great deal less likelihood of inducing a telegraph noise in any telephone instruments which may be connected to the line when the Morse signals are sent.

The effect upon the form of the waves is shown in Fig. 6, the upper set of diagrams representing the sharply defined waves when no condenser is inserted. This action of the condenser is due to the fact that it has the property of absorbing a certain quantity of electricity, and this amount must flow before the current reaches its full value in the line. The instant the key is closed, the condenser sucks in a certain amount of the current flowing, and, as it becomes charged to the potential of the E. M. F. impressed upon it, the current starts to rise in the line until, as the condenser becomes fully charged, it reaches its full value as determined by the resistance of the line. Therefore, instead of the Morse current reaching its full value instantly, it does so more gradually on account of the condenser sucking in a portion of the current. When the key is opened, the E. M. F. which holds the charge in the condenser is taken off, and the latter discharges in a direction opposite to that in which the current flowed when it was charged, which will be out over the line to ground at the distant end. The instant the key is opened the condenser discharges into the line and tends to keep the Morse current from falling suddenly, so that it dies out gradually. This condenser placed as shown will then have the effect of rounding off the corners of the waves produced by the instantaneous Morse impulses, by causing the current to rise and fall gradually instead of abruptly.

The circuit as shown in Fig. 5 and described is called the simplex circuit and comprises a metallic telephone circuit with a grounded telegraph circuit superposed upon it. It is the principal one used commercially to-day, and is very satisfactory in operation when properly set up and maintained. It is not the only commercial type of simplex circuit, however, as the form shown in Fig. 7 is sometimes used. This circuit likewise produces an extra telegraph circuit from a metallic telephone line.

Telephone terminals *A* and *B* are connected to the line through four condensers 1, 2, 3, 4, each having a capacity of four micro-farads. The talking current being alternating and of very high frequency will readily pass through these condensers. Two coils are bridged across each end of the circuit, on the line side of the condensers. These coils are of 500 ohms resistance each, and consist of many turns of wire wound on an iron core, which gives a very high impedance to alternating currents. Between these two coils the telegraph circuit is tapped in and completed through the ground. The action of this circuit is different from the one previously discussed. When *A* is transmitting to *B*, at a given instant, current passes through condenser 1, line wire *x*, condenser 2, through *B*, to condenser 3, line wire *z*, condenser 4, to *A*, and vice versa. Now, as the coils are bridged across the line, it might appear that some of the talking circuit would be shunted out. This would be the case if it were not for the property called self-induction, which the coils possess. When the current rises in the coil, the magnetic lines of force created in the iron core in turn cut all the turns of wire of the coil thereby inducing a current in the coil in an opposite direction to that which is flowing, thus tending to choke the original current back. This reactance depends upon

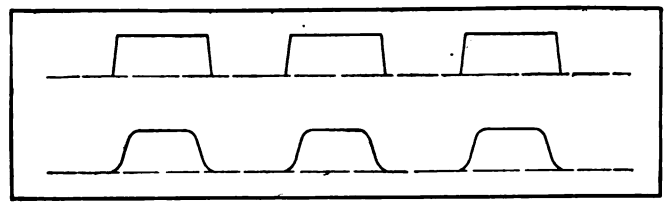

Fig. 6. Upper set of curves shows approximate form of "Morse" waves when no condenser is used; lower curves show less abrupt form produced by action of condenser.

the number of turns of wire on the coil, and the frequency of alternations of the current. The higher the frequency the greater the impedance, the number of turns remaining the same, and the lower the frequency the lower the impedance. Such a coil is called a choke-coil, impedance or reactance coil.

When *A* or *B* is transmitting practically all of the current that would tend to pass through the coils is choked back. The telegraph current passes through the two coils 5, 6, over the line wires and through the other two coils 7, 8, to ground. The resistance and reactance of the coils and of the line wires on each side of the circuit being the same, the current divides equally over both sides of the line, and, the drop in potential along each wire being the same, there is no difference of potential existing across the line; consequently the Morse signals cannot be heard in the telephone circuit and other stations can be bridged across the line. The one micro-farad condenser answers the same purpose as in the repeating coil circuit. In ringing over this circuit the alternating current passes over the line like the talking current, and and no difficulty is experienced, provided the condensers are of large capacity, on account of the low frequency of the ringing generator. In most modern exchanges one side of the ringing generator is grounded and obviously this could not be used with this circuit, because current would pass through the Morse leg to ground, thence back to the generator, and a me-

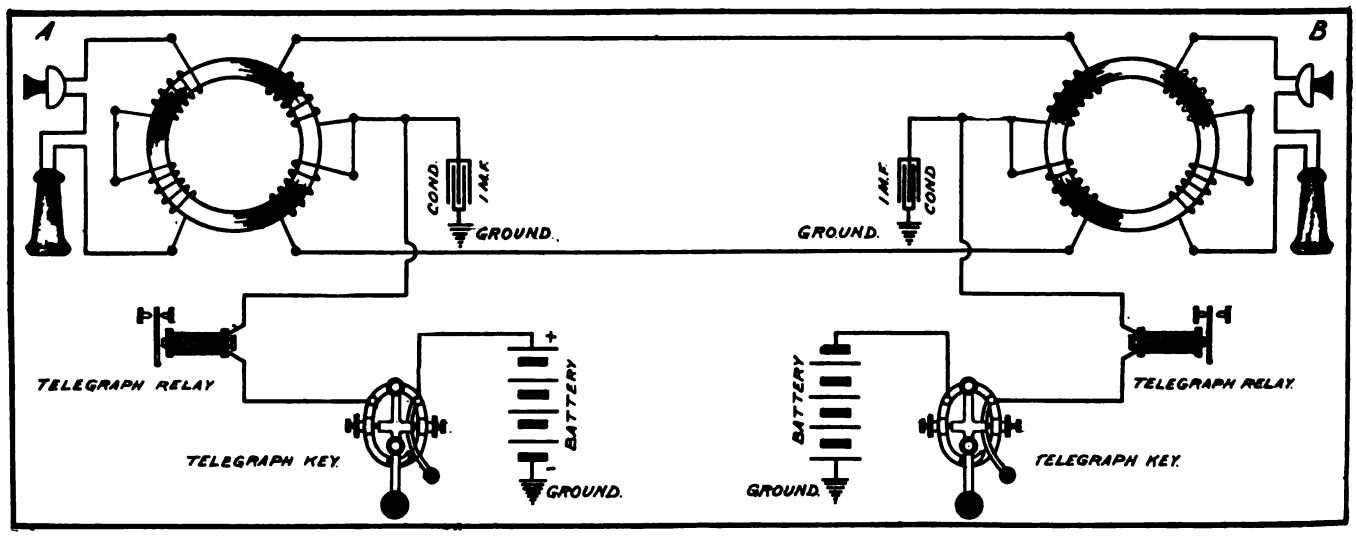

Fig. 5. Commercial type of simplex circuit, which comprises a metallic telephone and a grounded telegraph line, which can be worked simultaneously over a single pair of wires.

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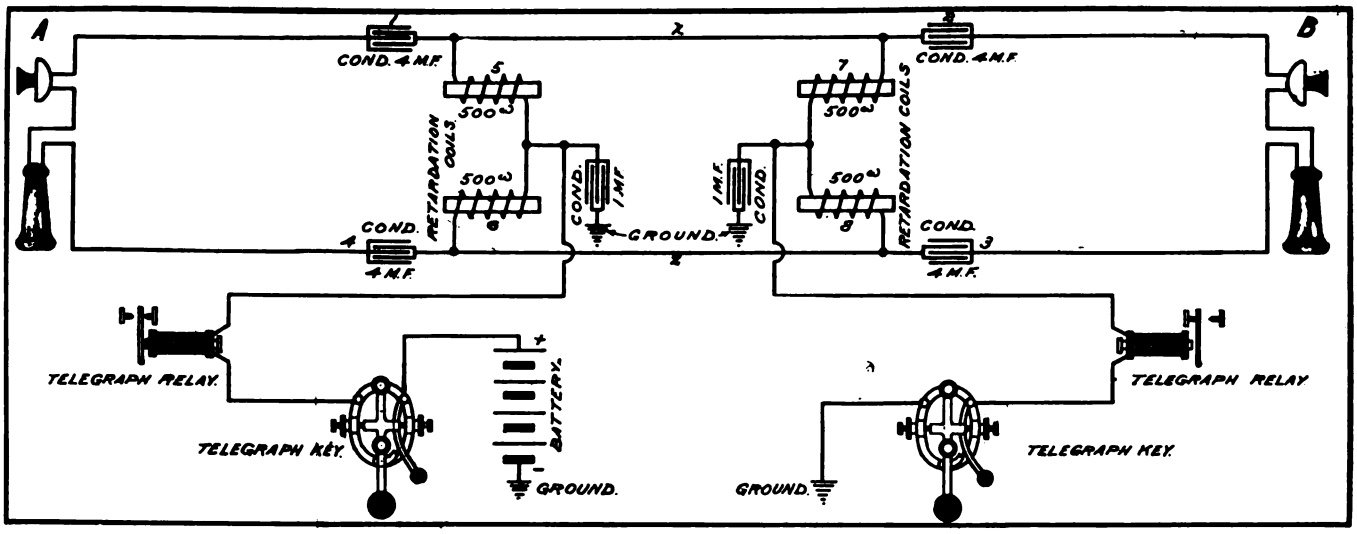

Fig. 7. The retardation coil type of simplex circuit, ordinarily not as well adapted to commercial use as the repeating coil type shown on the opposite page.

tallic generator circuit will therefore have to be used. In the repeating coil circuit this feature makes no difference, as the two windings on the coil have no direct metallic connection with each other.

The Seasoning of Telephone and Telegraph Poles*

By Henry Grinnell.

THE following statement shows, for conditions corresponding to those of the experiment, the length of time poles cut in the different seasons should be held before shipment to secure the lowest freight charges and at the same time minimize insurance and storage charges:

	Months.		Months.
Winter cut	4 to 6	Summer cut	2 to 4
Autumn cut	7 to 9	Spring cut	3 to 5

Air-dry weight of cedar is from 65 to 70 per cent of green weight, and an air-dry cedar pole contains about 20 per cent of moisture.

CHESTNUT POLES.

The poles at Thorndale were cut from younger trees than were those at Dover, and in consequence their weight per cubic foot of wood is considerably greater. In this case the weight of the green wood was greatest in summer. Spring, winter and autumn followed in the order named. The seasons' cuts, arranged in the order of their respective moisture contents, show that for seasoning periods of three months or less spring was the best time to cut, summer, autumn and winter following in the order named. For periods of twelve months or over, however, the order is winter, autumn, spring and summer.

Winter-cut poles at Dover weighed more per cubic foot when green than other seasons' cuts. Summer was next heaviest, and spring and autumn were lightest. Arranged in the order of lowest moisture content, the seasons' cuts were as follows:

When green: { spring / autumn } summer, winter.
At 3 months: spring, summer, autumn, winter.
At 6 months: spring, winter { autumn. / summer.
At 7 months: { winter / spring } autumn, summer.

At Pisgah, winter-cut wood was considerably heavier than that cut at any other season, and, save in a single case, at no time did it reach the dryness of the other cuts. Considering only the amount of moisture, summer here appears to be the best cutting season. Spring, autumn and winter follow in the order named.

Tables 3, 4 and 5 are derived from data obtained on chestnut poles at the three stations mentioned. They give for the average pole in each season's cut, at various stages of seasoning, the volume and weight in pounds per cubic foot and moisture content in per cent of the dry weight. The dry weight of chestnut wood is assumed to be 28.07 pounds per cubic foot, which is the figure given by Sharpless in Volume IX, Tenth Census.

[Volume, 22 cubic feet.]

Duration of seasoning, months.	Spring cut. Weight per cubic foot, pounds.	Spring cut. Moisture content, per cent of dry weight.	Summer cut. Weight per cubic foot, pounds.	Summer cut. Moisture content, per cent of dry weight.
0	50.8	81	51.5	83
1	49.0	75	48.8	74
2	47.5	69	47.4	69
3	46.5	66	46.8	67
4	46.0	64	46.6	66
5	45.5	62	46.4	65
6	45.1	61	46.2	65
7	44.5	59	46.1	64
8	——	—	45.7	63
9	——	—	45.0	60
10	——	—	44.0	57
11	——	—	43.4	55
12	——	—	43.0	53
13	——	—	42.7	52
14	——	—	42.4	51

Duration of seasoning, months.	Autumn cut. Weight per cubic foot, pounds.	Autumn cut. Moisture content, per cent of dry weight.	Winter cut. Weight per cubic foot, pounds.	Winter cut. Moisture content, per cent of dry weight.
0	50.8	81	51.8	85
1	48.4	72	50.8	81
2	47.2	68	49.8	77
3	47.0	67	48.7	73
4	46.8	67	47.5	69
5	46.6	66	46.3	65
6	46.2	65	45.3	61
7	45.5	62	44.5	59
8	44.7	59	44.1	57
9	43.9	56	43.8	56
10	43.2	54	43.2	54
11	42.8	52	——	—
12	42.5	51	——	—
13	42.2	50	——	—
14	——	—	——	—

Table 3. Weight and percentage of moisture of chestnut poles at Dover, N. J., based on 400 poles.

Table 6 is based upon original weight and does not consider the air-dry condition of the timber. Like Table 2, it is mainly valuable to the shipper in showing what reduction in weight may be looked for by holding poles cut in any season.

It will be understood that this table does not serve as a basis

*Abstract from a Bulletin of the U. S. Forest Service, continued from the issues of July 27 and August 3.

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for comparison of poles cut at different seasons, since in this case the practical consideration is not the percentage of the original weight lost, but the actual weight reached, which was shown in Tables 3, 4 and 5.

Duration of seasoning. months.	Spring cut, (volume, 20 cubic feet). Weight per cubic foot, pounds.	Moisture content, percent.	Summer cut, (volume, 21 cubic feet). Weight per cubic foot, pounds.	Moisture content, per cent.
0	53.0	89	54.0	92
1	50.1	78	50.1	78
2	47.9	71	48.2	72
3	46.4	65	47.4	69
4	45.4	62	47.1	68
5	44.8	60	46.8	67
6	44.4	58	46.7	66
7	43.9	56	46.4	65
8	43.6	55	46.1	64
9	43.6	55	45.7	63
10	43.6	55	45.2	61
11	42.4	51	44.7	59
12	43.0	53	44.2	57
13	42.5	51	43.7	56
14	42.3	51	43.3	54
15	42.1	50	42.9	53
17	41.8	49	42.5	51
17½	41.8	49	42.4	51
19	41.5	48	42.3	51
20	41.3	47	42.1	50
21	41.0	46	41.7	49
23½	40.7	45	41.3	47

Duration of seasoning. months.	Autumn cut (volume, 20 cubic feet). Weight per cubic foot, pounds.	Moisture content, per cent.	Winter cut (volume, 20 cubic feet). Weight per cubic foot, pounds.	Moisture content, per cent.
0	52.7	88	52.9	88
1	50.5	80	51.7	84
2	49.3	76	50.4	80
3	48.8	74	49.1	75
4	48.6	73	47.6	70
5	47.9	71	46.3	65
6	46.9	67	45.1	61
7	45.7	63	44.3	58
8	44.8	60	43.6	55
9	44.1	57	42.9	53
10	43.8	56	42.4	51
11	43.2	54	42.0	50
12	42.5	51	41.8	49
13	41.8	49	41.6	48
14	41.6	48	41.5	48
15	41.7	49	41.5	48
17	41.9	49	41.5	48
17½	41.8	49	41.5	48
19	41.8	49	——	——
20	42.2	50	——	——
21	——	——	——	——
23½	——	——	——	——

Table 4. Weight and percentage of moisture of chestnut poles at Thorndale, Pa., based on 600 poles.

Specific Gravity of Wood.

While there is but little, if any, difference in the specific gravity of pure wood substance or cellulose, regardless of the kind of tree, the specific gravity of wood as found in the tree varies considerably. Density, or the closeness with which the fibers are compacted in growth, affects specific gravity. The amount of water contained affects it greatly, and similarly its content of minerals, resin, or oils. These all affect specific gravity directly. Other things operating through these exert an indirect influence. Age influences the moisture content. Season varies the moisture content and perhaps also the content of albuminous matter.

Season of cutting.	Specific gravity.
Winter	0.8627
Spring, Summer	.8509
Autumn	.8467

Table 4a. Showing variation of specific gravity throughout the seasons.

Soil and climate influence both the density of wood and the substances it contains.

For the reasons just set forth, there may be considerable variation in the specific gravity of timber cut in any particular locality. For instance, young, thriftily grown timber cut in summer might easily have a greater specific gravity than old timber cut in winter; but in timber of approximately the same age and growth, that cut in winter would usually be heaviest, that in spring and summer of about the same weight, with the difference, if any, in favor of the summer cut, and that cut in autumn lightest.

The figures shown in Table 4a were obtained from the green chestnut poles cut at the three stations at different seasons.

Trees normally contain the greatest amount of water during that period when the roots are active and the leaves not yet out. In climates like those in which these experiments were made root activity commonly begins in January, February or March, the exact time varying with the kind of timber and the local atmospheric conditions. The results also indicate that green wood becomes lighter in late spring or early summer, when transpiration through the foliage is most rapid. The weight at any season, however, is doubtless much influenced by the amount of moisture in the soil.

The results are in accordance with those obtained by Robert Hartig in his investigations of the specific gravity of wood cut at different times of the year. From a careful study of thirty different species of trees practically all of the same age (16 years), which he grouped into three classes, he found, by eliminating as far as possible all variables other than the one under investigation, that the specific gravity varied materially with the season, as is shown in Table 7.[a]

Shrinkage.

The water in green wood is contained in the cell cavities, in intercellular spaces, and in the cell walls. When green wood is exposed to the air, the water it contains begins to evaporate.

Duration of seasoning. months.	Spring cut. Weight per cubic foot, pounds.	Moisture content, percent.	Summer cut. Weight per cubic foot, pounds.	Moisture content, per cent.
0	55.2	97	53.5	91
1	52.3	86	50.6	80
2	50.2	79	48.3	72
3	49.1	75	47.0	67
4	48.4	72	46.3	65
5	48.1	71	46.0	64
6	47.7	70	45.8	63
7	46.8	67	45.7	63
8	——	—	45.7	63
9	——	—	45.3	61
10	——	—	44.8	60
11	——	—	43.8	56
12	——	—	43.5	55
13	——	—	43.3	54
14	——	—	43.3	54
15	——	—	43.2	54

Duration of seasoning. months.	Autumn cut. Weight per cubic foot, pounds.	Moisture content, per cent.	Winter cut. Weight per cubic foot, pounds.	Moisture content, per cent.
0	54.7	95	56.5	101
1	51.7	84	54.3	93
2	50.3	79	52.7	88
3	49.9	78	51.5	83
4	49.6	77	50.7	81
5	49.0	75	49.8	77
6	48.8	74	49.2	75
7	48.3	72	48.3	72
8	47.3	69	47.7	70
9	46.4	65	47.5	69
10	45.8	63	47.2	68
11	45.5	62	——	—
12	44.8	60	——	—
13	——	—	——	—
14	——	—	——	—
15	——	—	——	—

The average volume of 30-foot poles was 21.12 cubic feet, and of 25-foot poles 14.70 cubic feet.

Table 5. Seasoning of chestnut poles at Pisgah, N. C., based on 600 poles.

The amount and rapidity of evaporation depend upon the length of time the timber is exposed, the amount of water in the wood, and the heat and dryness of the surrounding air. By far the greater part of the water evaporated during air seasoning is that from the cell cavities and intercellular spaces. Since the water contained in the cell walls is not greatly reduced, the shrinkage during air seasoning is very little. As soon, however, as wood begins to lose water from its cell walls, shrinkage com-

[a] Russian Forests, Vol. II, pt. 2. p. 4, Th. K. Arnold, St. Petersburg, 1899.

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mences, and continues as long as the amount of such water is reduced.

Shrinkage in wood may be distinguished as longitudinal, radial, and tangential. Longitudinal shrinkage, that is to say, the shrinkage which takes place in the direction of the length of the fibers, is practically inappreciable; radial shrinkage (in the direction of the radius, this being therefore the shrinkage which can be directly measured across the end surface of a log) is from 4 to 6 per cent; and tangential shrinkage (in the direction of the circumference) is about double the radial. In round timbers, such as telephone poles, shrinkage can best be determined by measuring the circumference.

Duration of seasoning, months.	Dover, N. J. Spring cut, per cent.	Dover, N. J. Summer cut, per cent.	Dover, N. J. Autumn cut, per cent.	Dover, N. J. Winter cut, per cent.	Thorndale, Pa. Spring cut, per cent.	Thorndale, Pa. Summer cut, per cent.	Thorndale, Pa. Autumn cut, per cent.	Thorndale, Pa. Winter cut, per cent.
1	4	5	5	2	5	7	4	2
2	6	8	7	4	10	11	6	5
3	8	9	7	6	12	12	7	7
4	9	10	8	8	14	13	8	10
5	10	10	8	11	15	13	9	12
6	11	10	9	13	16	14	11	15
6⅔	12	10	10	14	17	14	13	16
7	12	10	10	14	17	14	13	16
8	—	11	12	15	18	15	15	18
9	—	13	14	15	18	15	16	18
10	—	15	15	17	18	16	17	19
11	—	16	16	—	20	17	18	20
12	—	17	16	—	19	18	19	21
13	—	17	17	—	20	19	21	21
14	—	18	—	—	20	20	21	21
14⅔	—	—	—	—	21	20	21	22
15	—	—	—	—	21	21	21	22
17	—	—	—	—	21	21	21	22
17⅓	—	—	—	—	21	21	21	22
19	—	—	—	—	22	22	21	—
20	—	—	—	—	22	22	20	—
21	—	—	—	—	23	23	—	—
23⅓	—	—	—	—	23	24	—	—

Table 6. Loss of first weight of chestnut poles cut at three seasoning stations.

From thousands of measurements made on telephone poles during this experiment, it was found that shrinkage was so slight as to be almost negligible.

Duration of seasoning, months.	Pisgah, N. C. Spring cut, per cent.	Pisgah, N. C. Summer cut, per cent.	Pisgah, N. C. Autumn cut, per cent.	Pisgah, N. C. Winter cut, per cent.
1	5	5	5	4
2	9	10	8	7
3	11	12	9	9
4	12	13	9	10
5	13	14	10	12
6	14	14	11	13
6⅔	15	14	12	14
7	—	15	12	15
8	—	15	14	16
9	—	15	15	16
10	—	16	16	16
11	—	18	17	—
12	—	19	18	—
13	—	19	—	—
14	—	19	—	—
14⅔	—	19	—	—
15	—	—	—	—
17	—	—	—	—
17⅓	—	—	—	—
19	—	—	—	—
20	—	—	—	—
21	—	—	—	—
23⅓	—	—	—	—

Table 6, Continued. Loss of first weight of poles cut at a third seasoning station.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Sept.	Nov.
Heavy hardwoods...	41	38	36	36	39	35	39	38	34
Light hardwoods....	53	58	51	49	47	47	50	47	45
Coniferous woods...	60	58	59	54	60	60	60	58	58
Average of all..	51	51	49	49	49	49	50	48	48

Table 7. Percentage of moisture contained in wood cut at different times of the year.

(*To be continued.*)

The Extension Station as a Valuable Adjunct to Regular Service*

By W. W. Kinsley, Jr.

A SCHEME of wiring which provides for the receiving of calls at a main station and their transfer to either of two extension instruments is shown in Fig. 7. The operating features which are associated with this arrangement are similar to those described in connection with Fig. 4, of which the present circuit is a development. Incoming calls are normally received at the main station, where the bell is bridged across the line. At each of the two extension stations, although both sides of the talking circuit of the instrument are in connection with the central office the bell circuit is normally open, at the key con-

(*Continued on page 94.*)

*Continued from the issues of July 27 and August 3.

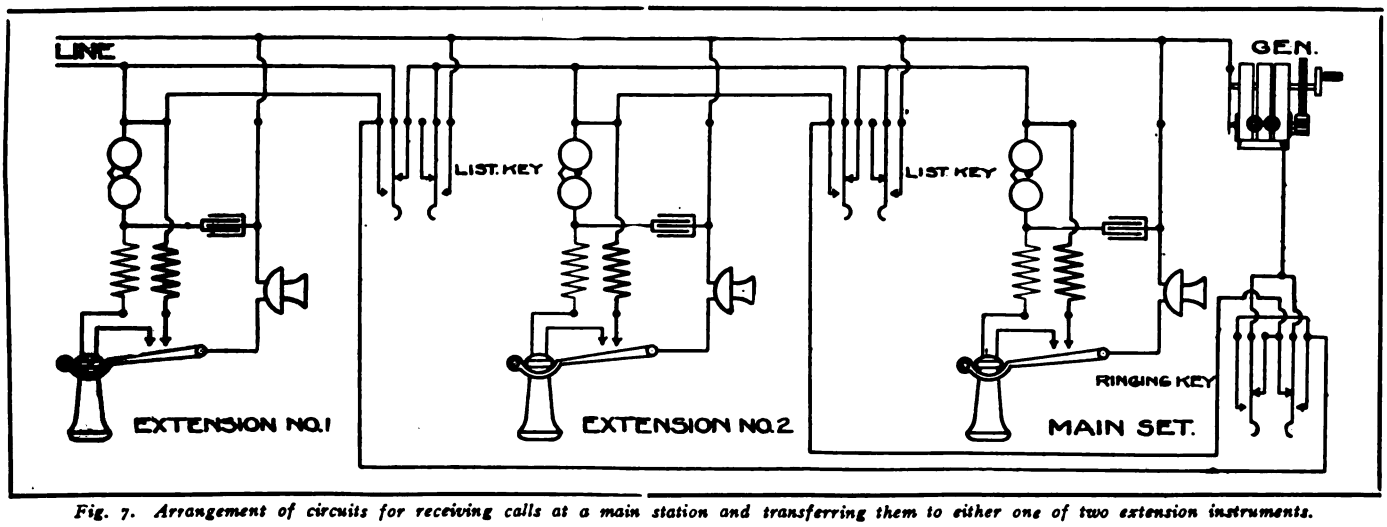

Fig. 7. Arrangement of circuits for receiving calls at a main station and transferring them to either one of two extension instruments.

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As the Editor Sees It

TELEPHONING UNDER COMPULSION.

VIRGINIA has some men connected with her law making and governing bodies who deserve a place in the front rank of telephone boosters. It will be recalled that this State led in the movement to compel railways to install in their stations telephones connected to both exchanges when two competing systems are operated in the city or town which the station serves. The State Corporation Commission, as mentioned in a news report on another page of this issue, has now taken a new step which tends to strengthen the standing of the telephone as an indispensable necessity under certain circumstances. We refer to the order compelling the Washington, Arlington & Falls Church Railway Company to equip and maintain a telephone system for the dispatching of trains.

This was recently entered after a conference between the officials of the Commission and the management of the railway. This conference took place as an immediate result of a serious accident which had taken place a short time previously. A careful consideration of the circumstances attending this accident, and the possibilities of future risk, led the commission to the opinion that the installation of a telephone system for use in controlling the movements of trains would be the most efficient means of securing the protection of the lives and property of the traveling public. The demand for such action, being the first order of the kind ever issued in Virginia, was not based upon any previous act of the Commission, nor did the Commission know of the issuance of any similar order by a body organized to supervise railways in any other State. This order was simply based upon the Commission's estimate of the value of the telephone as an efficient and practical means of fulfilling a public necessity.

Since the telephone has come into use in connection with train dispatching on electric railways, it has steadily advanced in the favor of its users, both on electric systems and on lines operated by steam power; and at present there are many railroads where the management would hardly be more perturbed by the breaking down of the motive power during a period of heavy traffic than by the failure of its telephone system. More than this, if due care is exercised in its construction and maintenance a telephone system is not a bit more liable to faults which will cause a complete interruption of service than the ordinary source of motive power. So far as we are aware, this order of the Virginia Corporation Commission is up to the present time unique, but its justice and thorough accordance with the best modern standards is likely to make it serve as a precedent of which railway commissions in other States will not be slow to take advantage. It is the final step necessary to make the system of dispatching which makes full use of the telephone a legalized standard.

ADVERTISING OF INEFFICIENT MANAGEMENT BY MICHIGAN BELL COMPANY.

W. A. JACKSON, president of the Michigan State Telephone Company, stated over his signature on July 25th, in a full page advertisement in the Dowagiac *Daily News*, that the accounts of his company for the Dowagiac exchange for the year 1906 showed a deficit of $51.94. This amount was obtained by balancing the gross earnings against the company's gross expenditures, itemized as general expenses, taxes, operating expenses, "reconstruction maintenance," trunk line repairs, instrument maintenance and 5 per cent. depreciation on the investment. No charge for interest on the investment, which is figured at $58,615.11, was included. In another part of the advertisement the company states that it is operating the exchange in this city at a loss of nearly $100 per annum.

This seemingly frank statement of the financial discredit which the Michigan Bell Company has brought upon itself by its management of this exchange is published in order to discourage the people of the city and its vicinity from investing in the securities of the Cass County Home Telephone Company, which is apparently meeting with hearty support in its efforts to establish a number of Independent exchanges in this locality. The evident intention behind this statement is to establish the principle that the Michigan Bell company, by its failure to make money in Dowagiac, has demonstrated that no opponent can succeed; and that in consequence the people would be foolish to invest their money in the securities of the Independent company. The absurdity of this proposition will be evident to any business man who has observed how rapidly a new concern, under active and careful management, may achieve success where an older organization has for years pursued a slow going "standardized" policy to the serious detriment of its business. To cite just one example of this nature, which, although outside of the telephone business, is probably familiar to traveling telephone men throughout the country, the popularity of the Waldorf-Astoria in New York City may be mentioned as typical. When George C. Boldt, coming from a comparatively small hotel in Pennsylvania, took charge of this great modern establishment, he was ridiculed freely by the older hotel men of the city, and there were few who set the date for his failure more than a few months distant. In spite of these predictions, the house has become famous throughout the world. Not only has it maintained its high reputation, but last year cleared over one million dollars profit.

The inability of the management of the Michigan State company to make money for its stockholders has long been a matter of concern to its owners. It is an open secret in telephone and financial circles that so great a lack of efficiency in achieving financial results has been attributed to those who have been in charge of the company's operations that a reorganization, which is even now going on, was made imperative. Under these circumstances it probably did not take the people of Dowagiac long to come to the conclusion that, even if Mr. Jackson's statement was well founded, it was no sort of proof that the Independent company would not be better handled than his, so the advertisement would hardly deter people from putting money into the new concern. Should the Bell company, however, attempt now to dispose of any of its stock in Dowagiac it would have to peddle it for a long time before finding any takers. The folly of such an advertisement as we have quoted—piling up useless expense on a deficit, to send forth a dangerous boomerang—is nothing less than pitiable.

A CONVENIENT SYSTEM OF WIRELESS TELEPHONY.

AN extremely flexible system of telephonic communication at a comparatively low cost would be the outcome of further developments which would extend the range, without altering the character, of the apparatus used in the recent "wireless" experiments at Put-in Bay.

The outfit used for reporting the yacht races, although an inspection shows that there has been no straining to secure compactness, is of very moderate size and its weight is low. As this is a complete set, adapted both to sending and receiving messages, and requires no expert operator, it is likely that the improvements in efficiency which its inventor hopes to bring about would make it a very formidable rival of the present small outfits for wireless telegraphy which are so much used on boats in all waters.

A very interesting statement made in the article on this subject, which appears upon another page, is that in spite of the susceptibility of the telephone to influence by electric currents of very small magnitude, in actual practice the efficiency of receiving speech is less likely to be reduced below a commercial standard than is the efficiency for a train of "Morse" signals under the action of the disturbances which sometimes harass the wireless telegraph operator of to-day so severely.

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The Law and Its Workings

CONDUCTED BY A. H. McMILLAN.

DO PAYMENTS IN ACCORDANCE WITH TERMS OF NEW CONTRACT WAIVE THE OLD?

There used to be two telephone companies in this city, but a short time ago the Bell people bought out the Independent company. When the Independent company's subscribers were taken over by the big company, there were a large number of people who had a twenty-five year contract for business telephones at $9 per quarter, which obligations were assumed by the Bell company. These long term subscribers have now been sent monthly statements under the new plan, their bill calling for the payment of $3. These are asking that if they pay that statement of $3, will the telephone company be able to submit a statement later for the difference between that old $9 per quarter rate and the rate of $60 per year for the business telephone on the ground that the payment of the statement for $3 annulled the new contract? Would it not be safest to refuse to pay the monthly statements and to insist upon paying quarterly according to the old plan? B. C. U.

The payment of the $9 rate monthly instead of quarterly would not relieve the new company from any of its obligations assumed when it took over the old company. The twenty-five year contracts would be binding so long as the rent were paid, no matter at what intervals the payments were made. The subscriber would not wave any of its rights by paying the $9 per quarter at the times requested by the new company. If the new company submitted a statement showing $3 to be due for the telephone rental for the month, it certainly would be estopped from later rendering a statement for the difference between $3 per month and $5 per month. The company would waive its right to claim more than its statement showed to be due.

MONTANA TELEPHONE LAW HELD UNCONSTITUTIONAL.

THE Montana law of 1905, (Sess. Laws, 1905, pg. 122, c. 55) authorizing the maintenance of telephone lines along the public highways outside of incorporated cities, has been held to be in conflict with the provision of the constitution of the state (Art. 15, Sec. 14) authorizing the maintenance of telephone lines within the state, and directing the Legislature to provide by general law regulations to give effect to that section. The reason for this decision is the failure of the law of 1905 to enable the business to be conducted in cities, it being held that a provision of the political code empowering city councils to regulate the erection of poles and stringing of wires within the city limits does not remedy the defect.

This decision was rendered by the Supreme Court of Montana in a suit for mandamus brought by the state at the instance of W. H. Crumb against the mayor and council of the city of Helena to compel the city officials to designate the place for the erection of poles for a telephone system upon the streets, avenues, and alleys of the city. The trial court refused to grant the application for mandamus, but this decision was reversed by the Supreme Court of Montana. The decision of the trial court was based upon section 1000 of the civil code which was passed pursuant to the constitutional provision above mentioned. That section reads as follows:

"A telegraph or telephone corporation, or a person, is hereby authorized to construct such telegraph or telephone line or lines from point to point, upon and along any of the public roads, by the erection of necessary fixtures, including posts, piers, and abutments, necessary for the wires; but the same shall not incommode the public in the use of such roads or highways."

By an amendment in 1905, the following was added:

"Provided, however, that the provisions of this act shall not apply to public roads or highways within the limits of incorporated cities or towns."

The amendment was held unconstitutional in providing that the act should not apply within the limits of incorporated cities or towns because to confine a telephone company of an individual operating a telephone line to country districts alone would defeat the very purpose of the grant in the constitution. The court stated that the command in the section of the constitution was to pass a general law of uniform operation with reasonable provisions and which will enable the telephone business to be conducted in the state as it was generally conducted throughout the country in 1899; that is, access to the business centers—cities and towns—must be granted. State vs. Mayor, etc., of Helena, 85 Pac.

ALLEGED DISCRIMINATION IN COLLECTING NEBRASKA TAXES.

THE Nebraska Telephone Company at Lincoln, Neb., has secured an order restraining the city from collecting a 2 per cent. tax levied on its gross receipts under an ordinance passed last February by the council. It is declared by the plaintiff that it has been discriminated against by the defendant in favor of the Lincoln Telephone Company which had been permitted to pay but 1 per cent. tax because it is allowed to subtract payments made in the performance of contractual obligations from the amount of the occupation tax imposed upon it by the ordinance. It is pointed out that according to the provisions of the ordinance each telephone company doing business in Lincoln must file on the 10th of each month with the city clerk a statement of its gross receipts, and if any such company shall fail to make such a statement then such occupation tax shall be the sum of $400 per month with penalties for non-payment.

The plaintiff has not complied with the ordinance because it claims that its provisions are unjust to it. The company takes the broad ground that the city has no legal right to tax the gross receipts of the company, the occupation tax or tax upon gross receipts being unconstitutional, in that it is double taxation, the gross receipts tax covering what is already covered by the franchise tax.

TELEPHONE TAX LAW IN OHIO.

Will you please tell us whether or not the physical property of telephone companies is exempt from taxation in this State where the company had paid the regular percentage upon its gross receipts? R. H. B.

The tax system of Ohio consists of an excise tax of one per cent. of the gross receipts of the company from business in the State. The gross receipts are ascertained by the State Board of Appraisers and Assessors from reports made by the companies to the auditor of the State. The payment of the excise tax does not exempt the companies' tangible property from taxation. The companies' physical property may therefore also be taxed.

ARE TELEPHONE COMPANIES COMPELLED TO FILE REPORTS OF CAPITALIZATION IN TENNESSEE?

AT the last session of the Tennessee Legislature an act was passed requiring all corporations, home and foreign, doing business in the State to file with the Secretary of State a report showing the amount of the capital stock, and accompanying this information with a fee based upon the capitalization. The corporations all over the State have organized to contest the validity of the law, and those which have complied with its provisions have endorsed the checks for fees "paid under protest."

The Memphis Telephone Company (Independent) has requested the Attorney General to advise it as to how the law would affect that corporation, it having been held by the Supreme Court last winter that this company "had no legal existence." The Attorney General replied that it was not within his province to determine the legal existence of the telephone companies, that being a matter for the courts. If, however, the companies continue to transact business and operate their lines under the protection of the law, they must conform to the laws governing corporations. The attitude of the Memphis company is that of seeking information rather than entering a protest, and there is no intimation that the matter will be fought.

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Varieties of Telephone Progress

VIRGINIA RAILWAY MUST INSTALL TELEPHONE DISPATCHING SYSTEM BY ORDER OF STATE CORPORATION COMMISSION.

AN accident on the line of the Washington, Arlington & Falls Church Railway led to an informal investigation, as a result of which the Virginia State Corporation Commission has issued an order which prescribes, among other measures for the protection of the traveling public, the installation and maintenance of a system of telephones to be used for controlling trains.

It seems that a short time ago there was a serious accident on the line of this road, which resulted in the death of one person and injury to others. Public indignation at what are termed the lax methods of operation in vogue along the line is reported to have been much aroused. Citizens of Falls Church even went so far as to hold a mass meeting, at which three or four hundred persons were present, to protest against the errors of management. After an informal hearing the State Corporation Commission ordered that telephones should be used at the dispatcher's office, and at the various stops on the road. In connection with the use of the telephone a system is prescribed whereby accuracy in transmission of orders from the dispatcher to men on the trains may be assured, and an accurate record of the movements of trains each day is insisted upon. To keep the latter record, and as a safeguard against accidents, the conductors are ordered to report by telephone in person to the dispatcher's office the time of their arrival and departure at certain stations specified in the order of the Commission.

CASS COUNTY HOME TELEPHONE COMPANY MAKES RAPID PROGRESS.

AT Decatur, Mich., the Cass County Home Telephone Company has just been granted a thirty year franchise to operate a telephone exchange. The leading citizens have expressed their pleasure at the admission of the company, which is rapidly building in neighboring towns. The entrance into Decatur is ascribed to the fact that business men of that place made a special offer to have the Home company build there, on account of the value of connections with the neighboring prosperous town of Volina, where an exchange is now under construction, which will open with an excellent subscription list. In addition to the Dowagiac exchange, which has previously been mentioned in these columns, the company will open in a short time a central office at Vandalia, which will have about two hundred subscribers; the latter two offices are to be cut into service at the same time.

LEGALITY OF BELL FRANCHISE IN NEW YORK CITY QUESTIONED BY ALDERMEN—FAULTS IN SERVICE ATTRIBUTED TO EXISTENCE OF MONOPOLY.

A REPORT of the Committee on Laws and Legislation to the Board of Aldermen of New York City questions the legality of the franchise under which the New York Telephone Company operates, and urges an investigation to ascertain the rights of the city in respect to this franchise. In making this investigation the committee states that it has met with numerous difficulties; but, from such information as it has been able to obtain, it concludes that the contention of the New York Telephone Company with respect to its rights to operate wires in the city by virtue solely of its charter from the State is at least of doubtful validity. The report recommends that the State shall observe the utmost care to avoid the danger of confirming the company in the exercise of privileges which are now of questionable validity. The imperfect information concerning the derivation of the right claimed by the New York Telephone Company to operate under privileges acquired from the Metropolitan Telephone & Telegraph Company has made it impossible for the committee to determine the validity of this claim. It has been unable to find out how these privileges were acquired. It draws attention, however, to the fact that one of the conditions upon which the privilege of operating was granted by the Board of Aldermen in 1881 to the Metropolitan Telephone & Telegraph Company, was that compensation should be paid to the city, and this provision has never been complied with by the Metropolitan company, or the present company, its successor.

In view of its findings the Committee recommends to the Board of Estimate and Apportionment a thorough examination of the points mentioned, in order to determine whether or not the present operating telephone companies should be required to obtain the consent of the Board in order to continue in operation, and also to determine the power of the Board to impose conditions affecting the operation, including compensation to be paid to the city.

A section of the report devoted to the company's service states that the reduction in rates for pay stations, established by the company some time ago, is not of general benefit to the public. This reduction has only affected a limited number of stations, and its failure to meet public expectations has caused considerable complaint. The Committee states that "it is satisfied that there is some just ground for complaint, and that service open to such fair criticism is a natural outgrowth of an unrestricted and uncontrolled monopoly of the business."

EXPERIENCES IN COLLECTING TOLL BILLS.

SOME statements in the article by Mr. Shipman in THE AMERICAN TELEPHONE JOURNAL, issue of July 20, have brought forth the following argument in favor of quarterly collections.

Mr. C. D. Warner, of Watertown, N. Y., says:

Having read the article very carefully, and having given this subject a great deal of thought after experience coming from the trial of both plans of collecting tolls monthly and quarterly, the writer finds that there is very much less expense in making quarterly toll collections than may be taken in at the same time the rent is collected, every quarter more economically than if one undertakes to make monthly collections for the tolls alone. There are in an exchange which has come under my observation about 80 per cent. of the subscribers who have toll bills, and the bills of fully 25 per cent. of this number will not exceed 25 cents in tolls during the three months, while 25 per cent. more will not exceed 50 or 75 cents for the quarter. To send out a collector makes the cost of collecting the tolls average more than the commission that is received, besides the extra labor of the office force.

"During the past ten years not more than two or three cases have arisen where the toll bills have been disputed when the original tickets or toll checks have been attached to the rent bill and sent out quarterly. It is our rule and custom never to allow a non-subscriber to use a subscriber's telephone for toll service except when the subscriber or some member of the family or firm gives his consent, in which case the name of the person giving the consent is entered on the ticket. Toll operators are instructed to always ascertain the name of the party who calls for toll service, and when this is entered on the ticket there is no trouble in recognizing the call. As toll collections are made at the same time the rent is collected it practically costs nothing to collect the tolls, thereby saving the entire commission on the tolls.

"The writer has practised for several years (and he finds other companies are doing the same) the plan of placing the rate for rental high enough so that 10 per cent. may be allowed when the bills are paid at the office of the company within ten days after they have been presented, or on or before the fifteenth day of the first month in the quarter. This percentage applies on rent only, and when paid quarterly in advance; and in order

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to have the benefit of the 10 per cent., the parties must pay the full amount, that is in arrears for both toll and rent, as well as that otherwise would be paid to a collector, and after ten years' experience with this plan, the writer has never found any disadvantage in it. The toll tickets, of course, are made out in duplicate, so that in case the original tickets are lost by the subscriber duplicates can be made. The duplicate tickets are retained only until the bill is paid, after which they may be destroyed.

"It is possible that if Mr. Shipman will 'sharpen his pencil' and begin to figure, or try this experiment, he will find that there is a better way than the one he suggests." *

TROUBLE REPORTS SHOWING ACCURATE TESTING ON THE LONG DISTANCE TELEPHONE LINE OF THE NEW YORK CENTRAL RAILWAY.

THE three following reports of tests on the long distance telephone line operated by the New York Central Railway, contributed by Mr. Van Akin, assistant superintendent of telegraphs, indicate very clearly the grade of insulation maintained on these wires. The actual reports convey the following information:

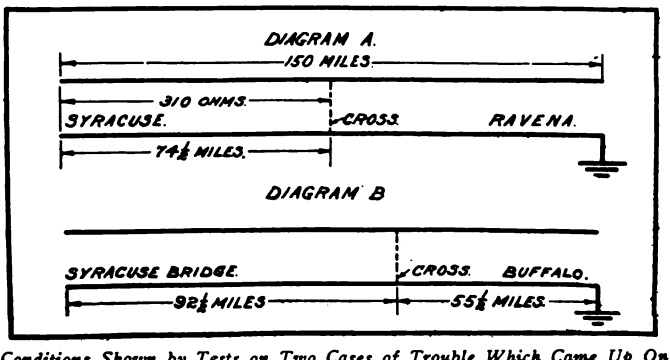
On July 24 it was found that bells on the line could not be rung, but transmission was very fair. Measurements on the section between Syracuse and Ravena, 150 miles apart, were taken. They gave the following figures, under the conditions indicated in Fig. 1, diagram A:

Loop resistance	310 ohms.
Varley resistance in cross	4 "
Resistance to fault	306 "

Dividing this resistance by the quantity 4 1-5, representing the known number of ohms resistance per miles of wire, indicates a fault 73 miles from Syracuse. During the progress of these tests the resistance in the fault varied, running up to 30 ohms.

The trouble was found 74½ miles from Syracuse—the measured resistance being about 7 ohms less than the wire resistance corresponding to this distance. The cause of the cross was a blast at a stone crusher east of Little Falls, which had thrown one wire off the glass and over against the other wire of the pair.

On July 25 trouble came in on the section of the line between Syracuse and Buffalo, 148 miles apart. First tests showed a pair to be loop crossed, with what appeared to be a "good" cross, but measurements indicated that the resistance in the cross was varying. The wires were set up as shown in Fig. 1 diagram B for a test from Syracuse, and vice versa, with respect to the grounding of one side, for Buffalo balance.



Conditions Shown by Tests on Two Cases of Trouble Which Came Up On the New York Central Long Distance Telephone Line.

Measurements from Buffalo when figured out gave the point of cross as about 10 ohms beyond the actual location, where the trouble man found it, while Syracuse was about 14 ohms at variance, its test also indicating the fault to be more distant than it really was. The trouble proved to be due to the crossing of the pair by a piece of rusty iron wire which had been thrown on the line.

The conditions prevailing in a case of trouble which came in on July 29 are indicated in Fig. 2. Between Syracuse and Frankfort one side of the telephone pair became crossed with a telegraph wire. Measurements were taken from Syracuse, as

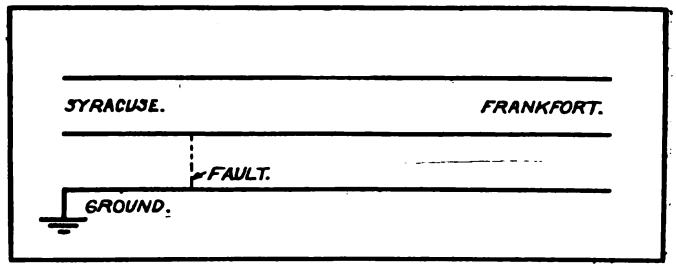


Diagram Showing Conditions When Telephone Line Became Crossed With Telephone Wire.

shown in the diagram, the two upper lines representing the telephone pair. The measurements showed a location four miles east of Syracuse. When the lineman was sent out he reported that one wire was off the insulator and crossed with the other, about four miles east of Syracuse, as indicated by the test which was made.

MUNICIPAL POWER TO REGULATE RATES NOT ABRIDGED BY FRANCHISE.

A DECISION of far reaching importance upholding the right of the city in Los Angeles, California, to fix telephone rates has been handed down in the United States Circuit Court by Judge Wellborn. This decision has a similar bearing on gas and electric light rates, as it broadly covers the field of operation of each of these separate classes of public utilities.

The case goes back to March, 1905, when the city council passed an ordinance regulating the sale of gas and electric light and fixing the charges for telephone service. The council acted in pursuance of authority granted by section 31 of the charter, the validity of which section was attacked in the present case. A subsequent ordinance required the public utilities companies to submit detailed statement of charges for services and revenue accruing, with which requirements all the companies but the Home Telephone Company complied.

The officers of the Home Telephone Company declined to make the required statement, whereupon the council fixed the rates and later prosecuted certain of the telephone company's officers. The company then applied to the United States Circuit Court for an injunction restraining the city from pursuing these prosecutions.

The attorneys for the telephone company contended that the franchise granted that company in 1902 and fixing maximum rates operated as a contract between the city and the company. It was a further contention that the State Legislature had no right to delegate the power of fixing rates to the city as was done in Section 31 of the city's charter.

"My conclusion upon the whole case may be summarized as follows," said Judge Wellborn at the close of his decision. "The charter of the city of Los Angeles, at the time of the passage of the ordinances sought to be annulled, conferred upon said city the power to regulate charges for telephone service, and said power was not surrendered or abridged by grant of plaintiff's franchise or otherwise, nor do said ordinances or either of them contravene any of the provisions of the Constitution of the United States. The demurrer to the bill is accordingly sustained."

The counsel for the telephone company urged that inasmuch as different rates were laid down for the Home company than for the Sunset Telephone Company, a discrimination had been made in favor of the latter. In regard to this, it was held that there was no discrimination in equity; that what would be a fair rate for one company would not be a fair rate for its competitor.

As a result of the decision, warrants have been issued for the arrest of the leading officials of the company for violation of the ordinance.

*EDITOR'S NOTE.—Is any one else sufficiently interested to give some additional practical views on this question?

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THE EXTENSION STATION AS A VALUABLE ADJUNCT TO REGULAR SERVICE.

(*Continued from page* 89.)

tacts, to ringing current from the exchange generator. When the attendant at the main set, on answering a call, finds that extension No. 1 is desired, the bell at this instrument may be rung by depressing the ringing key while the hand generator is being turned. If extension No. 2 is to be called it is only necessary to rotate the handle of the generator to transfer the call. To put either of these extension stations in communication with the calling party the listening key must be thrown to connect the instrument across the line. Throwing the key at extension No. 2 short circuits the main station, while a similar operation at extensions No. 1 cuts out both extension No. 2 and the main set. With keys in normal position any station can call central.

This arrangement is particularly adapted to a certain class of offices where two men occupying positions of responsibility wish to be free from unnecessary interruption, and still have practically unlimited facilities for originating outgoing calls.

In Fig. 8 are shown two exchange lines, each terminating in a main station. An extension set is so arranged that it may be called from either main station and a person at this extension station may at will talk on either line, short-circuiting if desired the main station connected to that line. It will be observed that the bell regularly associated with the instrument at the extension station is on open circuit, and a bell and listening key located near this instrument are associated with each of the main sets. When bell No. 2 rings, the person at the extension station simply removes the telephone from the hook and talks, securing privacy, if desired by throwing listening key No. 2. To obtain similar conditions on line No. 1 the switching key must be thrown. While a main set is short circuited through a listening key at the extension, the corresponding bell at the extension station is connected across the line and if the key is left in the operated position after a conversation is finished calls will be received here. At the same time the bell is in series with the hand generator at the main set, so the attendant at this instrument may call the extension set to obtain communication with the central office. The necessary privacy and other advantages are thus secured to the extension station without risk of leaving either line or main set out of commission through carelessness in handling the keys at the extension set. This circuit is an extension of the principle of that given in Fig. 4 and it might be further developed by using the methods given in the discussion of Fig. 7.

As pointed out in the beginning, too great complication in extension set circuits is not desirable, and so the logical succeeding steps of intercommunicating systems and private branch switchboards are to next be taken.

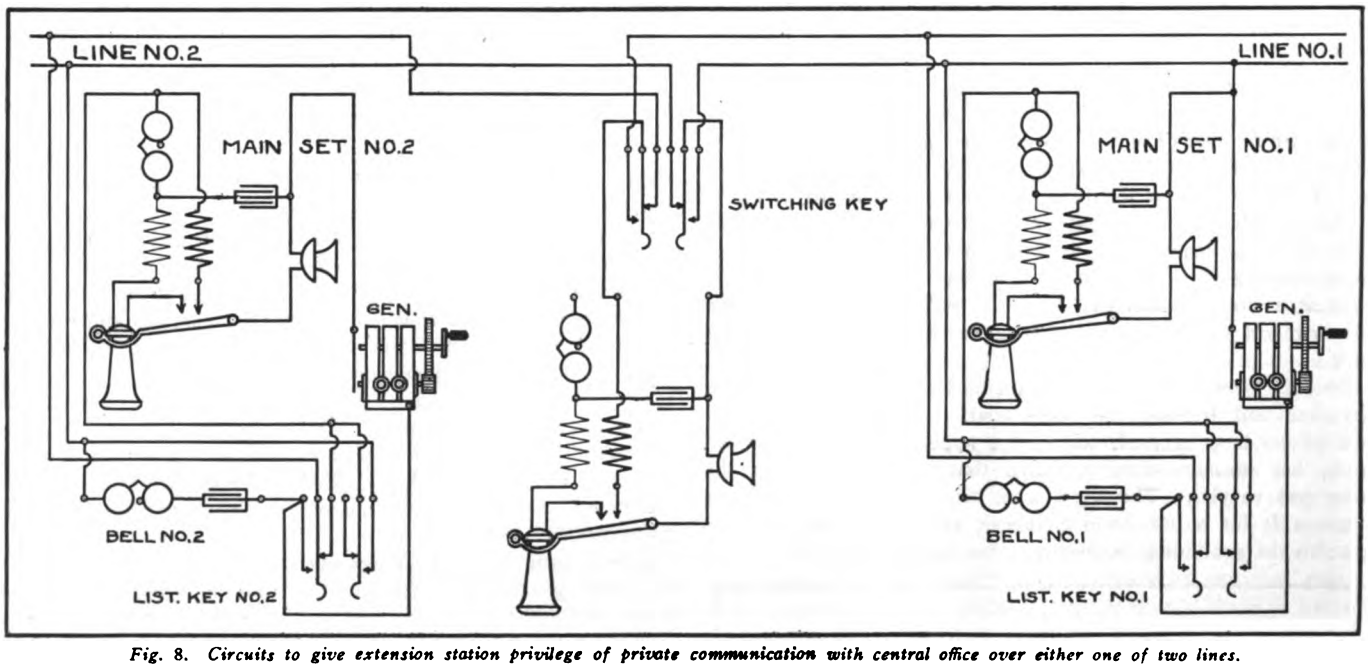

Fig. 8. Circuits to give extension station privilege of private communication with central office over either one of two lines.

WIRELESS TELEPHONY PROVEN A COMMERCIAL POSSIBILITY.

(*Continued from page* 84.)

The "microphone" coherer, magnetic detector, electrolytic "polariphone," carborundum or silicon detector all serve as wireless telephone receivers, being more or less perfectly "quantitative" receivers. Of all forms which the writer has tried, however, the "Audion," or hot gas responder, seems not only the most sensitive but to give the clearest and most perfect quality to the reproduced tones. Its various members are absolutely fixed relatively to each other, and the tuning qualities of the Audion therefore are absolutely determinate and unchanging; its electro-static capacity is considerably less than that of any of the before mentioned types.

The problems of syntonization here are the same as in the wireless telegraph, with the difference that by virtue of the sustained or weakly damped oscillations the attunement at the receiver may be much more accurate than in the "spark" telegraph. This means, of course, a larger number of simultaneous communications without intereferences. Moreover, it is easy to read human speech through a great amount of "cross talk," wireless telegraph signals, atmospheric disturbances and induction noises, when even the keenest ear of the most experienced "wireless" operator would be helpless to decipher a Morse message of monotonous dots and dashes coming in under similar unholy conditions!

NO OVERHEAD FRANCHISE AT SAN ANTONIO.

AT San Antonio, Texas, investigation has shown that the Southwestern Telegraph & Telephone Company has no franchise to erect an overhead telephone system in the city. Mayor Callaghan claims that the city has the power to order the company to vacate the streets. The discovery of the lack of an overhead franchise means that the company will have to come before the city council and plead for a franchise. It is not probable that such a grant will be made unless the company agrees to lower its rates.

The present situation arises from the testing of an order by the local management compelling the city to pay for all long distance calls. This precipitated an investigation which brought to light the fact that the company has no franchise.

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FOR SALE—Visual signal, common battery, P. B. X. board; 120 lines, 24 volts, with 5 plug end trunks. In good condition; exceptionally low priced. Address Box 888, care of AMERICAN TELEPHONE JOURNAL, 100 William Street, New York. 888

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FOR SALE—Three section Western Electric Co. switchboards, type E, 167, 100 drops each. Will sell one section at a time. Are at present working in our office. Reason for sale, need more capacity. Further information address Manager, Gibson Home Telephone Co., Gibson City, Ill. 890

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For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

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WANTED—Position as manager. Have had 7 years' experience. Familiar with common battery and magneto exchange. Thoroughly understand construction work. Can give best of references. Address Box 892, care of AMERICAN TELEPHONE JOURNAL, 100 William Street, New York City. 892

WANTED---Continued

WANTED—An experienced telephone manager to take charge of an exchange in a Southern town of 10,000 population. Over 500 telephones now in service; business rate $3.50 and residence rate $1.50 per month. Manager will be required to purchase a nominal interest in the exchange as a guarantee of good faith. Several small nearby exchanges to be developed. This is a most excellent opportunity for a competent man to develop valuable telephone property. For further particulars address Box 891, care of AMERICAN TELEPHONE JOURNAL, 100 William Street, New York City. 891

WANTED—Position as superintendent or foreman of repairs or construction. Twenty-five years' experience with Bell and Independent companies. Best references; good reasons for changing from present position. Address Box 883, care AMERICAN TELEPHONE JOURNAL, New York. 883

WANTED—Chief operator to take entire charge of exchange having 2,500 subscribers; none but those capable of commanding the respect of operators need apply. State salary, experience and success obtained. Address Box 878, care AMERICAN TELEPHONE JOURNAL, New York. 878

COMPETENT man wishes position as telephone auditor or accountant, capable of going ahead with office detail or installing system, latest ideas, best of references. Address, Box 856, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 856

WANTED—Position as manager, contract agent or high class solicitor in the independent field by a thoroughly competent telephone man with twelve years' practical experience. Familiar with magneto and common battery systems. Now holding position as manager of three exchanges for an extensive independent concern. In present position two years. Salary to start $100 per month. Address, Box 874, care AMERICAN TELEPHONE JOURNAL, 100 William Street New York. 874

SALESMAN—Wanted for Atlantic Coast States to sell Telephone Apparatus and Supplies. Must have selling experience, be familiar with exchange work and able to get business and hold it. State age, experience and references. Address Box 876, care AMERICAN TELEPHONE JOURNAL, New York. 876

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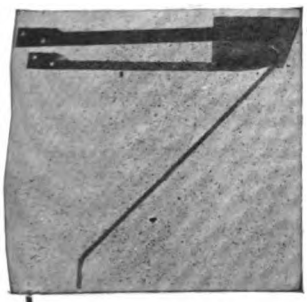

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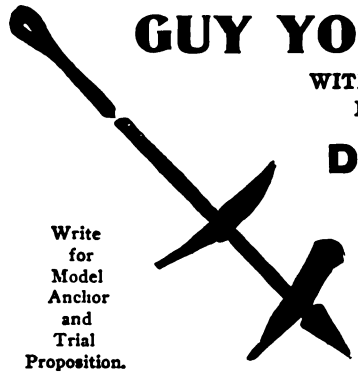

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Reasons—Ways—Values

DIVIDED MULTIPLE SWITCHBOARDS.—(896.)

Will you kindly advise us what is meant by the term" divided multiple board" and how it differs from the usual common battery multiple type of switchboard? R. H.

We will briefly describe the reason for and the construction of a divided multiple switchboard. The capacity of a multiple switchboard is limited necessarily to the "reach" of the operator and it was to get beyond this limitation that the divided multiple system was devised.

In this system the lines are divided into four groups, a separate switchboard being provided for each group. The switchboards are all located in the same building but are operated independently of one another, there being no trunking necessary between the boards. Each subscriber's instrument is provided with a means whereby anyone of the four boards may be signaled according to the position of the number of the line with which communication is desired. Each board is provided with multiple connection only to the lines in a single group located at one of the individual boards.

In calling for a connection the subscriber presses the proper button which causes his signal to show on the board in which is located the desired line so that trunking between the boards is unnecessary. The action of the system is shown in Fig. 888, which is a simple circuit in which are included the subscribers' signals appearing on the different boards—Nos. 1, 2, 3, 4 indicate polarized drops which are sensitive only to current traveling in a certain direction. When the subscriber actuates button No. 1 on his telephone he causes a positive current to flow out on the tip side of his line, returning on the sleeve side, thus causing signal No. 1 to show. By pressing No. 2 button he causes a reversal of his current, thus operating signal No. 2. Signal No. 3 is operated in the same way with a positive current to ground and by reversing the direction of the current signal No. 4 is displayed.

There are at present no switchboards of this type in operation in this country, two which were in use having been changed recently.

EFFECT OF HEATING ON RESISTANCE OF CONDUCTORS.—(897.)

We would like to have you settle an argument for us through the columns of your valuable paper. Aside from settling an argument, it will assist us in making some measurements upon which we have been in doubt. The argument is that the heating of conductors increases their resistance. Kindly advise us as to whether this is the case or not. W. H. K.

The correctness of your contention depends upon the material you have in mind when you state that heating of a conductor increases the resistance.

The resistance of metals depends upon the temperature and the resistance is increased by the heating. There are, however, some substances in which the reverse is true. This is the case

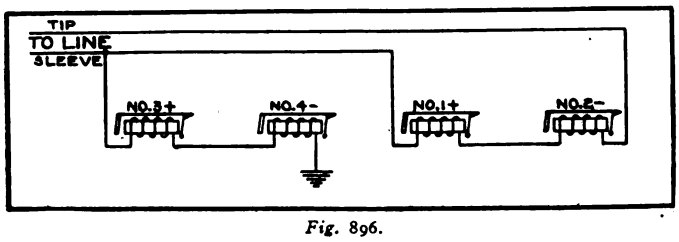

Fig. 896.

with carbon and the resistance of the filament of an incandescent lamp when lighted is only about half as great as when the conductor is cold.

All metals, however, have their resistance increased by a rise in temperature. The percentage increase in resistance with rise of temperature varies with the different metals and varies slightly for the same metal at different temperatures. The increase is practically uniform for most metals throughout a considerable range of temperature. The resistance of copper increases about .4 per cent. per degree centigrade, or about .22 per cent. per degree Fahrenheit. The percentage increase in resistance for alloys is much less than for simple metals. The change in resistance of one ohm per degree rise in temperature for a substance is called the temperature coefficient.

If a resistance of a conductor at a certain temperature is known, the resistance the conductor will have at a higher temperature may be found by multiplying the temperature coefficient for the substance by the number of degrees increase and by the resistance at the lower temperature and adding to this result the resistance at the lower temperature. The product of the temperature coefficient by the number of the degrees increase gives the increase in resistance of one ohm through that number of degrees and multiplying this by the number of ohms gives the increase in resistance for the conductor. The result is practically correct for moderate ranges of temperature likely to be encountered in practical work.

RELATIVE VALUE OF METALS FOR TELEPHONE WIRE.—(898.)

We would be greatly pleased to see in your columns as soon as convenient a discussion of the relative merits of iron, copper and aluminum for use in the manufacture of telephone wire. Any data which you may be able to give us on this subject will be greatly appreciated. D. D. D.

In answer to your question we believe Table 898 will be self explanatory, as it shows properties of various metals used in the manufacture of wire, together with approximate costs. The costs cannot be stated exactly, owing to the rapid fluctuation of prices; however, we believe it will be close enough for all practical purposes.

	Melting point Fahrenheit.	Electrical conductivity, silver = 100.	Heat conductivity, silver = 100.	Tensile strength, pounds per square inch.	Weight per cubic inch in lbs.	Approximate cost per pound copper = 100.
Iron	3,000°	16.	11.9	50,000	.278	12.25
Steel	2,500°	12.	11.6	90,000	.283	10.5
Copper	1,93[illegible]°	99.9	73.6	38,000	.32	100.
Lead	62[illegible]°	8.3	8.5	2,000	.41	31.5
Tin	446°	15.	14.5	400	.263	175.
Zinc	774°	29.	19.	12,000	.258	33.25
Aluminum	1,10[illegible]°	63.	38.	17,000	.093	210.
Bronze	1,55[illegible]°	6.5	—	45,000	.313	140.
Brass	——	22.	23.6	35,000	.3	91.

Table 898.

Owing to the variation of composition of alloys, the melting point of brass and the heat conductivity of bronze cannot be definitely stated.

EFFICIENCY OF TRANSMITTER ACCORDING TO CIRCUIT.—(899.)

Will you advise as to which would give the best results, and why, under the following conditions: A transmitter the resistance of which varies from 10 to 5 ohms working on a circuit of 10 ohms or the same instrument working on a circuit of 100 ohms? Current in both cases is to be furnished by two wet batteries giving about 16 amperes, at about 3 volts. J. C. K.

The resistance of your transmitter is ten ohms under normal working conditions in a circuit of ten ohms. The transmitter varies five ohms, therefore the variance in your circuit would be as five is to twenty, or twenty-five per cent. That is, when you are speaking into your transmitter you cause your current through the induction coil to vary twenty-five per cent.

With your ten ohm transmitter in the one hundred ohm circuit you get a total of 110 ohms. Then, by speaking into the transmitter you cause a variance of five ohms, which is as five is to one hundred and ten, or about 4½ per cent.

You can readily see the advantage in the low resistance circuit, as you have the difference between four and one-half and twenty-five.

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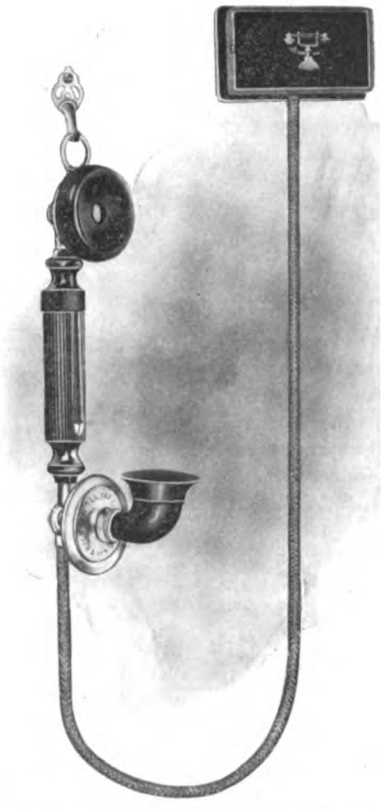
ERICSSON EXTENSION SET



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It is stronger, the finish is better and the work more uniform.

The base and cover for the mounted induction coil, shown by cut, are both made of drawn sheet steel, with a fine and lasting finish of black Japan.

A steel clamp spring holds the induction coil securely to the base.

Suitable terminals, insulated from the base, are provided for the line wires on one side and for the handmicro on the other side of the coil.

An opening on each side of the cover, having the edges bent in so as not to cut the insulation, allows a neat arrangement of the outside wiring.

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Patents Recently Granted

TELEPHONE SYSTEM.

D. H. Wilson, Chicago, patent 860,175, July 16, 1907, assigned to G. W. Kretzinger, Chicago.

The system described in this patent is one in which the instruments are provided with signaling apparatus, and induction coils so arranged that during the signaling operation the primary of the induction coil is in the local circuit and the secondary in the line circuit. During the talking operation, however, the local circuit is cut out and the secondary winding, the transmitter and the receiver are in series with the line. Also, connected in series with the line, is a dynamo from which the current for talking is derived.

FUSE HOLDER.

J. C. Ralls, Los Angeles, Cal., patent 851,997, April 30, 1907; one-quarter assigned to E. J. Fleming and one-quarter to P. Usser, Los Angeles.

The fuse holder referred to in this patent consists of a tube made of hard fiber or other suitable insulating material, at each end of which is a tubular extension and secured thereto a thimble or metallic end piece, serving as attaching means for the respective heads or connectors at the ends of the holder. Each of the thimbles being screw-threaded to engage with the screw-threaded sockets at the inner ends of the heads.

TELEPHONE LINEMAN'S SEAT.

C. Randall, Mabel, Minn., patent 857,203, June 18, 1907.

The device described in this patent is a seat to which are attached two grab arms and a fork-shaped piece. The entire apparatus is so designed that it may be attached to the lineman's belt. To set it in place on a pole the grab arms are pressed against the sides of the pole by the lineman's knees in such a manner that the points with which they are provided enter into the wood.

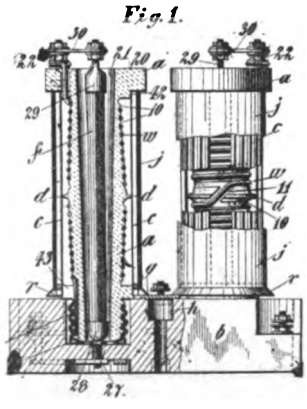
The fork-shaped piece is then adjusted, by means of a cord attached to it and extending up through the seat, so that the point may enter into the pole and be held there securely by the lineman's weight, the object of the whole being to provide a seat for the use of persons working at the top of high poles or other places.

LIGHTNING ARRESTER.

G. L. Foote, New York, patent 857,045, June 18, 1907, assigned to Foote, Pierson & Co., New York.

The lightning arrester described in this patent consists of a cylindrical section *a* of porcelain around which is coiled the conductor *w*, the convolutions increasing in diameter from each end of the cylinder to the middle point *d*. The coiled conductor *w* is surrounded by a corrugated ground plate *c* and the entire device is enveloped by the insulating fireproof cylinder *j*. The por-

Fig. 1.



tion of the arrester above described serving as a protection against lightning discharges.

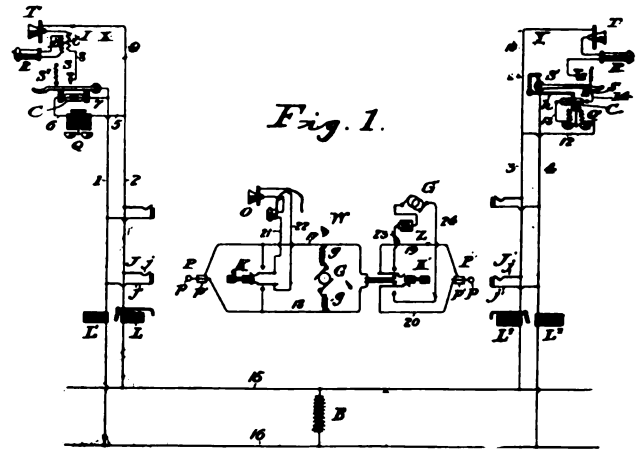
In the opening 21 of the porcelain cylinder *a* is inserted a fuse containing cartridge *f* which connects with the line at points 27, 30, and serves as a protection against current of abnormal amperage. The entire equipment is mounted on the porcelain base *b*.

TELEPHONE EXCHANGE SYSTEM.

E. E. Clement, Washington, D. C., patent 860,902, July 23, 1907.

The telephone system described in this patent comprises one in which the supply of current for operating the line signals is sup-

Fig. 1.



plied by the storage battery *B*, the source of power for talking being the generator *G* bridged, through suitable impedances *g* and *g'*, across the cord circuit *W*.

The generator *G* and the battery *B* are so connected to the cord circuits and the line terminals respectively as to have the like poles of each opposed, thus giving a balance in potential across the line signal and also keeping the battery charged to its highest potential at all times.

ANTI-BUZZING DEVICE.

A. Shaffer, East Columbus, O., patent 859,464, July 9, 1907.

This device consists of a flat piece of wire netting, a disk of waxed paper coated with paint or shellac, a ring of mica, a concavo-convex piece of metal and two disks of paper all fastened together by metal clips. The entire combination is then inserted in the receiver in place of the customary diaphragm. The inventor states that this arrangement eliminates the buzzing commonly observed in telephone receivers.

CONDENSER.

S. A. Beyland, Elyria, Ohio, patent 859,731, July 9, 1907, assigned to Dean Elect. Co.

The salient feature of this invention is the method of construction of the condenser case. The terminals of the tin foil sheets are brought up to two bolts passing through the cover of the casing from which they are electrically insulated. These bolts extend outward to a sufficient length to be passed through a rack or frame and to be secured on the other side by means of nuts, in the manner of fastening tubular relays.

COIN COLLECTING DEVICE.

W. W. Dean, Chicago, patent 859,549, July 9, 1907, assigned to W. E. Co.

In this device is provided a temporary coin receiver in which it is necessary for the subscriber to deposit a coin before being able to secure the attention of the central office operator. The coin is, however, retained in such a position as to be accessible to the subscriber in the event of his not being able to secure the connection desired. The connection having been established with the called station, the coin is transferred from the temporary receiver into the coin box by the operator sending suitable current out upon the line.

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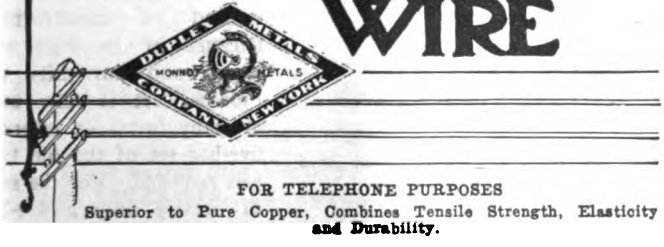
MONNOT COPPER-CLAD WIRE COSTS LESS AND IS SUPERIOR



FOR TELEPHONE PURPOSES
Superior to Pure Copper, Combines Tensile Strength, Elasticity and Durability.

to Pure Copper Wire, as it affords the non-oxidizable, acid-proof qualities of copper—combined with the tensile strength and high elastic limit of steel. This is

Monnot Copper-Glad Wire
(A Steel Wire with Non-porous, Welded Copper Coat.)

Let us send you our booklet. It tells the story.

DUPLEX METALS COMPANY
208 Fifth Avenue, New York City
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From Shops and Factories

PRACTICAL COMMENTS ON THE HARGIS CABLE JOINT.

IN a technical report to W. N. Matthews & Bro., St. Louis, Mo., on "The advantages and disadvantages of the Hargis cable splicing joint," Mr. Kempster B. Miller has brought out some points which will be useful to those who are interested in the time and money saving features claimed for this device.

Mr. Miller found that an expert cable splicer in handling two splices between two 100 pair 22 gauge paper insulated lead covered cables took 2 hours and 37 minutes by the Hargis method, and 2 hours 30 minutes by the ordinary method. The man's lack of experience with the Hargis joint caused him to lose time in grouping the spliced ends of the wires so that they would fit properly within the protecting sleeve. Considering the cause of this loss of time, Mr. Miller states his conclusion as to the relative amount of time required to make the two kinds of splices is as follows: "For a skilled cable splicer equally experienced in making both kinds of splices, there would not be much difference in time required in making a simple splice between two through cables; there would probably be a slight difference in favor of the Hargis joint. In making Y-splices or tap splices there would be a greater difference in favor of the Hargis joint, in view of the greater ease in making the wiped joint, and also of the greater convenience in splicing the wires of the three cables, due to their arrangement in the splice."

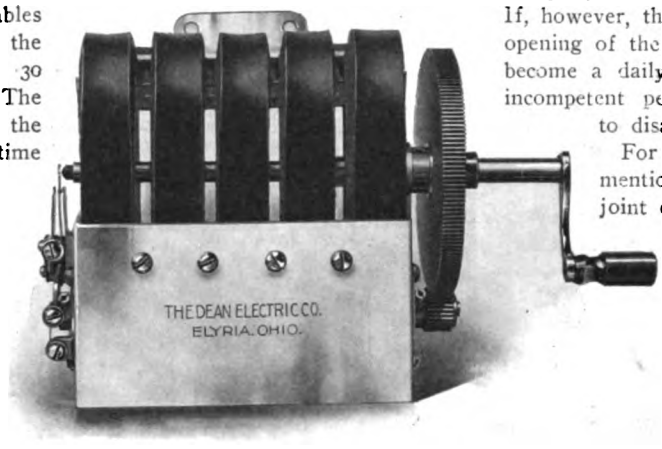

Fig. 1. The Dean hand ringing generator, assembled.

Comparison of list prices of the Hargis joint with current market prices for materials used in the ordinary splice indicated a lower first cost for the ordinary joint. Mr. Miller, however, states that while he believes that to a company regularly employing a cable splicer the entire first cost of the Hargis joint for labor and material would exceed that of an ordinary splice, to a small company, with an insufficient amount of splicing to regularly employ a skilled cable splicer, he thinks that the Hargis joint would prove as cheap or cheaper than the regular joint, since he is convinced that an intelligent workman could in a very short time learn to make the wiped joint necessary in the Hargis splice. Apropos of this he mentions the fact that the wiped joint in the Hargis splice is in reality a poured joint, and requires much less skill in the making than do the two wiped joints in the ordinary splice, which joints are usually made in a horizontal position.

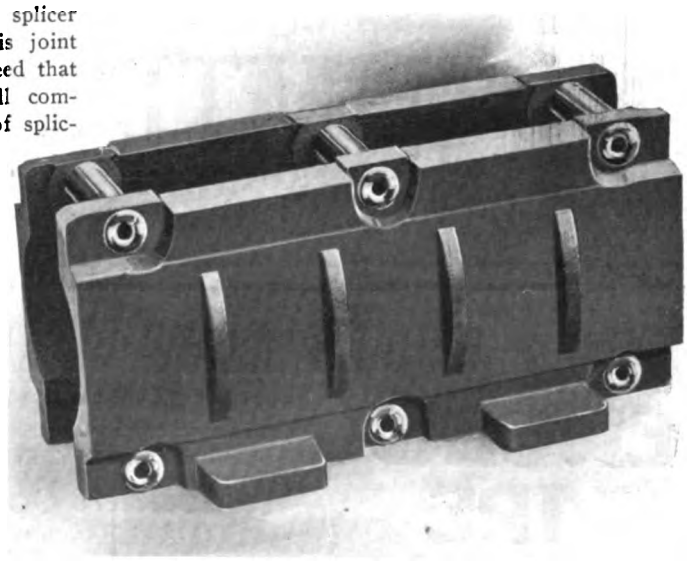

Fig. 2. Base castings, riveted together to form magnetic field of Dean hand generator.

As the chief reason for the production of the Hargis joint is considered to be the rendering of the conductors in the splice accessible for changes and tests. Mr. Miller had comparative tests performed which led him to the conclusion that in plants of all sizes the cost of opening and closing the Hargis splice will be much less than for opening and closing an ordinary splice, and the saving will be relatively greater in small plants than in large ones.

With regard to the effect of the use of this type of joint upon the maintenance of the plant, Mr. Miller draws attention to the fact that much depends upon the management. The facility in opening a cable splice afforded by the use of the Hargis joint is in itself a very desirable thing. If, however, this facility is misused, i. e., if the opening of the splice is, because of its ease, to become a daily occurrence, and to be done by incompetent persons—it may in the end lead to disastrous results.

For aerial construction the report mentions advantages in the Hargis joint due to the ease of inspecting the wiped joint on top, and the accessibility of conductors, when open, due to their hanging downward. The fact that in adding a terminal to a cable stretched horizontally, the Hargis joint would require more slack than an ordinary splice is mentioned as a disadvantage. For underground work Mr. Miller states that the use of this type of joint is feasible where only a very few cables pass through a vault or manhole, although interference might be expected, owing to the position of the joint if a large number of cables were present. The report is concluded with the statement that the Hargis joint is readily adaptable to the needs of men who are able to learn how to lay up and join the wires in a cable splice correctly, but who lack the dexterity necessary for the proper wiping of a joint of the ordinary type. The Hargis joint is not only made in a comparatively simple way, but if a poor joint is made its defects are readily discernible.

THE DEAN HAND RINGING GENERATOR.

THE Dean Electric Company, of Elyria, Ohio, has perfected a hand ringing generator for use on magneto circuits which embodies so many points of excellence that it has superseded the generator the company has been using in the past.

This new generator is made up in three sizes—three, four and five-bar—with no difference in the method of construction. Because of its high efficiency and durability the four-bar set is now used in many instances where a five-bar set of the old type was required. For the sake of brevity only a five-bar set (Fig. 1) will be analyzed with reference to details of construction.

The only castings used in the Dean generator are in the field

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In the measurement of duration of messages on your toll lines

ASSURES GREATEST RETURNS

on your investment and tends to put your toll service on a fair and impartial basis.

The Calculagraph

mechanically computes the elapsed time between the start and the finish of a toll message accurately to the second.

And being entirely mechanical it shows no favoritism.

IT MAKES NO CLERICAL ERRORS

Our Booklets Tell Why.

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1437 JEWELERS BLDG., NEW YORK CITY

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SIMPLICITY

Note how easy it is to splice pairs when you use HARGIS CABLE SPLICING JOINTS. Note how easy it is to get into the joint in case you have to test out for trouble.

If you are stringing several lengths of cable and a storm blows up, you can get your cable ends into a moisture-proof HARGIS JOINT in no time and thus prevent moisture from getting into your cables. When the weather clears up, your lineman can go out and splice the pairs in each joint.

While an expert cable splicer is rigging up his platform, etc., to start to work on a horizontal joint, a lineman can wipe in a HARGIS JOINT. The lineman can have all his pairs spliced and be off to the next job about the time the expert splicer would be ready to begin wiping the second end of his horizontal joint.

Making a splice with a HARGIS JOINT is so easy that you don't need a cable platform. There is no need for a drip pan to catch the paraffine, because the HARGIS JOINT is submerged in the paraffine pot, and there is no waste. The moisture has to go out. No uncertainty.

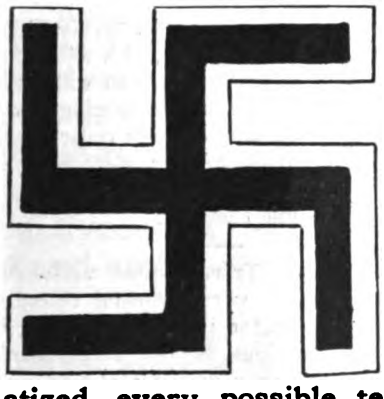
SEND IN YOUR ORDER TO-DAY

W. N. Matthews & Brother

Manufacturers of Patented Money Saving Specialties.

214 North Second Street ST. LOUIS

Branches: New York and San Francisco.



IS IT GOOD LUCK?

No, it is not "luck" which has built up our business, although some competitors call us "lucky." It has been twelve hard years of systematic and conscientious effort in developing our apparatus through successful stages to the present high state of efficiency. "Luck" has absolutely no place in our factory, for every step in the making of our apparatus is systematized, every possible test made, and perfect goods sent our trade. So that though they may believe in the "Swastika" or "Good Luck" sign, we know the reason for their good service, their abundant dividends and general prosperity.

May we bring you "Good Luck" now through the use of our telephone apparatus? Write our nearest office your requirements today.

Central Telephone & Electric Company

Makers of High-Grade Telephone Apparatus. Dealers in Telephone Supplies (Exclusively)

Main Office and Factory:
2131-37 LUCAS AVE., ST. LOUIS, MO.

120 Liberty Street, New York City
237 Commerce St., Dallas, Texas

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pieces, it being found that the best mechanical and electrical results are thus obtained. A fine grade of iron, made after a special formula, is used for this purpose. All of the remaining parts of the generator are made from drawn metal or heavy rolled stock, thereby assuring the strongest and most reliable construction.

The first operation of assembling is to securely rivet together the two base castings by means of heavy brass post separators to form a magnetic field, as shown in Fig. 2. This is done previous to the operation of boring or milling the inside or ends of the castings so that an exactly circular field may be obtained. If the field surfaces were milled before the castings were thus solidly bound together any slight inaccuracy in riveting would spoil the alignment and make it impossible to obtain a uniform air gap between the field and the armature.

Since the efficiency of any generator depends upon the uniformity and size of this air gap the Dean generator is constructed to insure both accuracy and permanence in its adjustment. The next step shows a laminated armature (Fig. 3) carefully turned down by a special process so that, when assembled in the field space, it will give a uniform air gap throughout its whole surface. The Dean engineers draw attention to the fact that it has been repeatedly proven that a very small air gap is not necessary for high electrical efficiency in a magneto generator, but rather one which is balanced with respect to the magnets and armature winding. This is one of the secrets of the Dean efficient design and it is made permanent by the careful construction of parts.

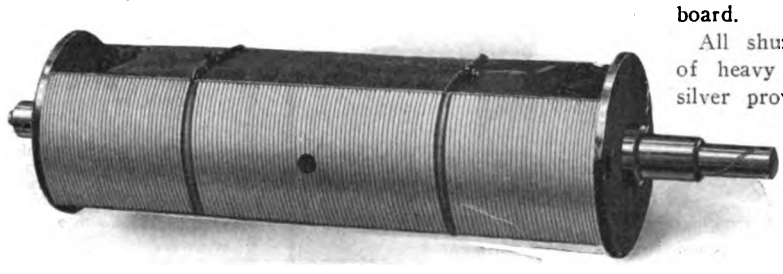

Fig. 3. Accurately dimensioned laminated armature of Dean generator.

The end pieces containing the armature bearings of the Dean generator are of novel design, so as to effectually prevent any change in the air gap space (Fig. 4). In the first place the armature bearings are of specially prepared brass and the end pieces supporting these bearings are maintained exactly in position by six (6) diagonally stamped lugs that offer a solid brace on the inner surface of the castings. When finally screwed in place there can be no slipping, and since the possibility of a worn bearing is reduced to a minimum the adjustment is permanent and accurate and is productive of high efficiency.

While the construction and adjustment of the end piece is the feature of the "Dean" generator, there are other mechanical characteristics of almost equal value. The crank shaft operates on brass bearings held in place by these same rigid end pieces. The gear wheels are of heavy formed brass, therefore very rigid and durable, and each tooth is cut separately to assure a perfect meshing of the gear and pinion. The magnet bars are of a special steel which gives magnetic permanency and are sprung onto the field pieces and held in place by a front plate (shown in Fig. 1), which in turn is securely fastened by machine screws. An additional brace and aligning strip is provided at the top of the bars in the rear by a plate which is used to secure the generator to the mounting board.

All shunting springs are of heavy flexible German silver provided with platinum contracts and insulated from each other by hard rubber separators and bushings. These shunt springs are furthermore assembled on a small removable plate which keeps the parts intact, even when removed from the generator. The different shunt combinations thus are made interchangeable so that a series or bridging effect can be readily obtained from the same generator by simply removing one screw so as to release the one shunt and allow it to be replaced by another

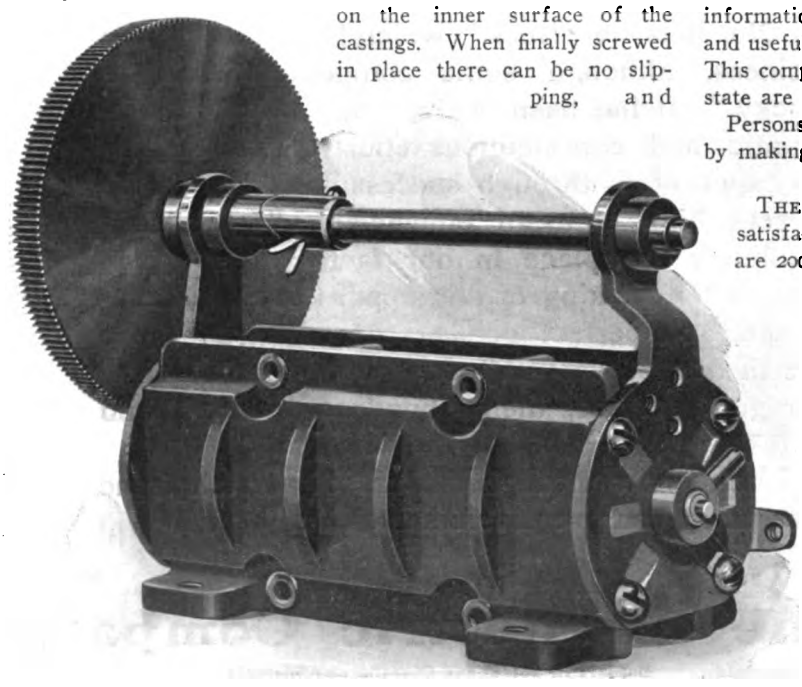

Fig. 4. View of movable parts of generator assembled with field.

PAGE AND HILL COMPANY, Minneapolis, Minn., has issued a very neat and attractive booklet entitled "White Cedar Poles," in which is given, in addition to prices and a telegraph code, much information relative to telephone poles that will prove interesting and useful to exchange managers contemplating new construction. This company makes a specialty of white cedar poles, which they state are particularly well adapted for telephone construction.

Persons desirous of securing a copy of this booklet may do so by making a request of the company.

THE L. M. ERICSSON TELEPHONE MFG. CO. reports a very satisfactory increase in sales. Among recent orders filled are 200 line equipments for Princeton, W. Va.; Blakely, Ga., and Hot Springs, S. D. These boards are fitted with the Ericsson indicator jack, claimed to be the smallest automatic drop made. The drop, jack, and restoring mechanism are all enclosed in a soft iron tube of 11-16 inches diameter, and the combination is mounted in the board individually, being retained in position by a single nut.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., has recently obtained contracts for central energy multiple and generator call switchboards at Seattle, Wash.; Sheridan, Ind.; Elida, New Mexico; Gays, Ill.; Oregon City, Ore.; Mishawaka, Ind.; Moosomin, Sask., Canada; Terre Haute, Ind.; Revelstoke, B. C.; North Warren, Pa.; Rochester, N. Y.; Southwest Harbor, Me.

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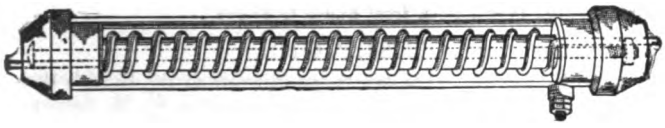
SKY ROCKET ARRESTERS PROTECT



In the Sky Rocket Arrester a 50-inch length of wire is built up into a succession of coils around a porcelain tube, thus having a choking or reactance effect, and surrounded by an iron cylinder to which is attached the ground wire.

When current of excessive potential, such as lightning, strikes the line wire it will not travel over this succession of coils into the telephone or switchboard. Instead it chooses the shorter path to ground, which is obtained by leaping the minute air gap between the discharge points of the wire helix and the grounded iron cylinder.

EXPERTS AGREE AS TO ITS WORTH

In a very interesting discussion on the relative values of lightning arresters of various types, **Chas. P. Steinmetz**, Chief Engineer General Electric Co., says:

"In regard to the reactance or choke coil, I also fully believe in the effectiveness of the reactive coil. . . . . It is obvious that against high frequency oscillations, against traveling waves of steep wave front, the reactive coil offers a very marked and satisfactory protection."

Sky Rocket Arresters

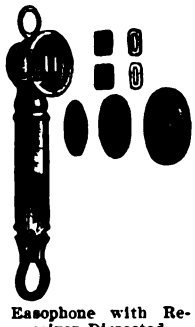
Embody in their construction the highest points of development of choke coil-reactance arresters, and as lightning is of very high frequency and has an exceedingly steep wave front it will be readily appreciated that they are particularly adapted to the protection of telephone lines against lightning discharges.

Write to-day for sample

Chance Manufacturing Co.
Centralia **Missouri**

Easophones
The WIRE & TELEPHONE COMPANY of AMERICA ROME, N.Y.

Do you hear me?
Yes, I am using an Easophone.
Good, so am I.
It certainly "makes good."



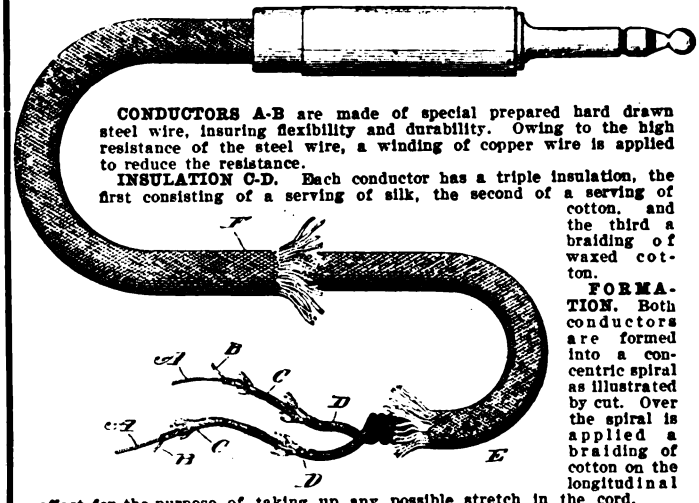
Easophone with Receiver Dissected.

THE RECEIVER, as illustrated, is comprised of a long, powerful, high grade permanent horseshoe magnet, extending from the ear piece to the transmitter end of the instrument, being moulded and solidly incased in vulcanized hard rubber. The slip coils are placed on the electro magnet cores, and are held rigidly in position by German silver plates. Two connecting screws in the receiver cup are provided for attaching the flexible silk cord conductors directly to the receiver coils. This direct connection is made possible by a channel through the moulded handle between the arms of the horseshoe magnet, and extending directly into the receiver case. This construction provides a magnetic field of high intensity at the pole face of the receiver magnet. This general design and construction makes ours the most efficient and durable and satisfactory receiver on the market.

See ad. of August 3rd and August 17th and write for Bulletins Nos. 101 and 102

THE WIRE & TELEPHONE COMPANY OF AMERICA
ROME, N. Y.

Promior BB Stool Cord



CONDUCTORS A-B are made of special prepared hard drawn steel wire, insuring flexibility and durability. Owing to the high resistance of the steel wire, a winding of copper wire is applied to reduce the resistance.

INSULATION C-D. Each conductor has a triple insulation, the first consisting of a serving of silk, the second of a serving of cotton, and the third a braiding of waxed cotton.

FORMATION. Both conductors are formed into a concentric spiral as illustrated by cut. Over the spiral is applied a braiding of cotton on the longitudinal effect for the purpose of taking up any possible stretch in the cord.

RE-ENFORCEMENT SPRING made of very high grade steel wire is inserted in the hollow of the cord at PLUG END for the purpose of doubly re-enforcing the cord at the end that is subject to the greatest usage. The spring is inserted in a manner that prevents the conductors from being thrown out of alignment, making it almost impossible to break the cord at the PLUG END—regardless of how the operator may insert or jam it into the switchboard jacks.

OVERALL BRAID E-F. Consists of special high-graded linen thread boiled in wax. A double braiding is applied at the plug end for the re-enforcement.

Let us quote you our new prices
They're in your favor

Runzel-Lenz Electric Mfg. Co.
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Condensed News Reports

NEW COMPANIES.

LESLIE, ARK.—The Leslie Telephone Company, of this city, has been incorporated with a capital stock of $15,000, of which $3,000 has been subscribed. Among the incorporators are W. R. Foley, president; H. F. Wilson, vice-president; John R. Clay, secretary and treasurer; Geo. W. Smith, A. C. Edwards, C. V. Reyno, W. Mills and F. P. Greenway.

NAPOLEON, IND.—The Napoleon Telephone Company has filed articles of incorporation with the Secretary of State. The capital stock is given at $15,000. The company proposes to construct, equip and operate a telephone exchange in Napoleon, and telephone lines throughout Ripley, Decatur, Franklin, Dearborn, Ohio, Switzerland, Jefferson and Jennings counties. The following directors have been elected: Jacob A. Meyer, Frank J. Grow, G. W. Foreman and Lafayette T. Cox.

SEWELLTON, KY.—Articles of incorporation have been filed by the Sewellton Telephone Company, of Russell county. It has an authorized capital stock of $300.

WALLACE, N. C.—The Wallace Telephone Company has been chartered to maintain and operate a telephone line in Wallace, and lines in Duplin county. It has an authorized capital stock of $3,000, and the incorporators are G. R. Wood, R. B. Colwell, W. T. Murphy and others.

McHENRY, N. D.—The McHenry Telephone Company, with a capital stock of $15,000, has filed articles of incorporation. Among the incorporators are Anton Jensen, E. J. Horn, Chas. Burke, of McHenry, and others.

BLANCHESTER, O.—The Harlan Telephone Company, of Butlerville, P. O. address Blanchester, has been incorporated with a capital stock of $5,000 by J. T. Sharp, E. H. Smith, E. D. Jones, J. E. Spurling and Frank Carroll.

ARNETT, OKLA.—Articles of incorporation have been filed by the Arnett Telephone Company, of Arnett. It has an authorized capital stock of $10,000, and the incorporators are C. O. Shaffer, J. O. Ralston and J. J. Henry.

HOOD RIVER, ORE.—The Home Telephone Company has been organized at this city. The capital stock is given at $40,000 and it is stated that the full amount has been subscribed.

MURDOCKSVILLE, PA.—A new Independent telephone company, to be known as the Murdocksville Independent Telephone Company, has been organized and expects to file articles of incorporation. Among those interested in the new enterprise are J. C. Campbell, W. W. Inglefield, D. M. Scott, J. H. McLarn and Joseph Cooley. It is the company's intention to build lines from Finley township, Allegheny county to Murdocksville, Five Points, Burgettstown and other points.

BANCROFT, S. D.—An Independent telephone company, to be owned by the citizens of Bancroft, has been organized. Work on the construction of its system is to be commenced at once, and connections are to be established with a number of farmers' lines.

CAMANO, WASH.—The Camano Telephone Company, of Camano, has filed articles of incorporation. The capital stock is given at $500, and the incorporators are E. Garrison, E. G. Freeman and F. Van Cleve.

SOMBRA, ONT., CAN.—Among the newly organized Independent telephone companies is the South Lambton Telephone Co-operative Association, Ltd., of this city. The following officers and directors have been elected: E. Tomlin, president; J. F. Selman, vice-president; G. M. Shepardson, secretary; G. W. Smith, treasurer; directors: H. S. Selman, J. F. Rivers, Alfred Selman, G. L. Smith, J. T. Stokes.

FRANCHISES.

POCATELLO, IDAHO—The Independent Telephone Company, of Salt Lake City, has decided to apply for a franchise at this city and compete with the Bell company.

ALEDO, ILL.—The People's Telephone Company has applied for a franchise to the city council of Aledo and is making active preparations to commence business.

MAROA, ILL.—Application for permission to construct and operate a telephone system at Maroa has been made by Dr. D. S. Anderson. If the franchise is granted he contemplates connecting his plant with the Independent lines at Argenta.

SABETHA, KAS.—A twenty-year franchise has been granted by the city council to the Sabetha Mutual Telephone Company.

PENN YAN, N. Y.—The village council has been requested to grant the Yates County Telegraph and Telephone Association a franchise at Penn Yan.

ELMWOOD, O.—It is the intention of the Elmwood Improvement Association to appeal to the Council of Elmwood Place to grant a franchise to the Independent Telephone Company to operate in the village.

HEBER, UTAH.—The United States Forest Service has filed a petition for the right of way for a telephone line between Heber and Stockmore.

UINTA, UTAH.—The Uinta Telephone Company has applied for a franchise and right of way over the public highways of Wasatch county for the construction of telephone lines.

FINANCIAL.

EARL, ARK.—The Earl & Tyronza Telephone & Telegraph Company has increased its capital stock from $5,000 to $10,000.

HUMBOLDT, IA.—At a recent meeting of the Rural Union Telephone Company it was decided to increase the capital stock to $100,000.

CEDARBURG, WIS.—The Freistadt and Cedarburg Telephone Company has increased its capital stock from $3,000 to $7,000.

ELECTIONS.

BIRMINGHAM, ALA.—The officers and directors of the People's Home Telephone Company are Henry B. Gray, vice-president; W. H. Hassinger, secretary; Henry L. Badham, A. L. Fulenwider, W. B. Harper, directors.

CONCORDIA, KAS.—The following officers were elected at the annual meeting of the Northern Kansas Independent Telephone Association: President, C. L. Brown, Abilene; vice-president, H. L. Pierce, Belleville; secretary, D. C. Tyler, Clifton; treasurer, W. W. Delsworth, Beloit.

ASHLAND, O.—The Star Telephone Company, which owns and operates exchanges in Congress, Creston, Homerville, Jeromeville, Lakeville, Lodi, Loudonville, Paradise Hill, Red Haw, Seville, Wadsworth and West Salem, together with the toll stations at Burbank, Funk, Hayesville, Lakefork, Mohicanville, McZena, Olivesburg, Pavonia, Perrysville, and Rowsburg, has elected the following officers: President, G. E. Ullman; vice-president, S. H. Grabill; treasurer, George R. Freer; secretary and general manager, Howard Swartz; assistant general manager, Charles W. Good.

YANKTON, S. D.—The Yankton Independent Telephone Company has elected the following officers: Fred. Schnauber, president; R. H. Jones, vice-president; F. L. Van Tassel, secretary; W. H. Edmunds, treasurer. The officers and M. P. Ohlman, C. J. Novotny and C. H. Dillon form the board of directors.

COMBINATIONS.

FAIRFIELD, ILL.—A controlling interest in the Wayne County Telephone Company has been secured from W. B. Spriggs, the former owner, by C. S. Hilliard, under whose management the plant will be materially improved.

DANA, IND.—The properties of the Embarrass Telephone and Telegraph Company, which include exchanges at Borton, Isabel, Redmon, Oakland and Kansas, have passed into the possession of Milton Collier, of Dana, Ind., the consideration being $57,000.

SHELBINA, MO.—The Shelbina Telephone Exchange, formerly owned by W. W. Tracy, has become the property of J. H. Wood, the purchase price being $13,500. Many improvements in the plant are to be made.

MISCELLANEOUS.

SHERIDAN, ARK.—The Sheridan Telephone Company has been purchased by Messrs. J. B. Shaw and Geo. W. Walker.

LOUISVILLE, KY.—The lines of the Home Telephone Company of this city were severely crippled during a recent storm.

CORIN, MO.—The Miller Telephone Company's plant at this city has become the property of J. J. Risk, of Memphis, Mo.

KENT, O.—The Kent Home Telephone Company sustained a loss of about $1,000 during a recent fire.

BEAUMONT, TEXAS.—The cables of the Beaumont Telephone Company were damaged to the extent of several thousand dollars during a recent storm.

CHESAW, WASH.—Plans for the establishment of an Independent telephone service in Okanogan are being considered by the people of that place. Mr. Kora F. Briggs, who has erected a line from Chesaw to Myncaster, and who expects soon to establish a central office at Chesaw, is one of the prime movers in the enterprise. Indications point to the success of the project on account of the dissatisfaction engendered by the poor service of the Bell company.

WHEELING, W. VA.—Considerable damage was done to the lines of the National Telephone Company during a severe storm which visited this city.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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National Pole Company

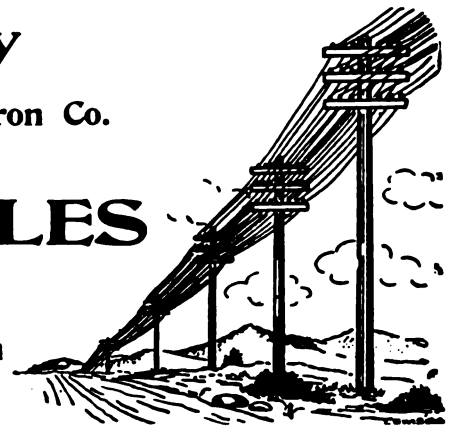
SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from
Maine to Washington



CROSS ARMS

LONG LEAF YELLOW PINE

All Heart, Special Sizes, Plain Painted
or Creosoted. Large Stocks,
Quick Shipments.

LEWIS LUMBER & MFG. CO.,
Hattiesburg, Miss.

Our Price is Right

1st TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.
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YARDS:
ESCANABA
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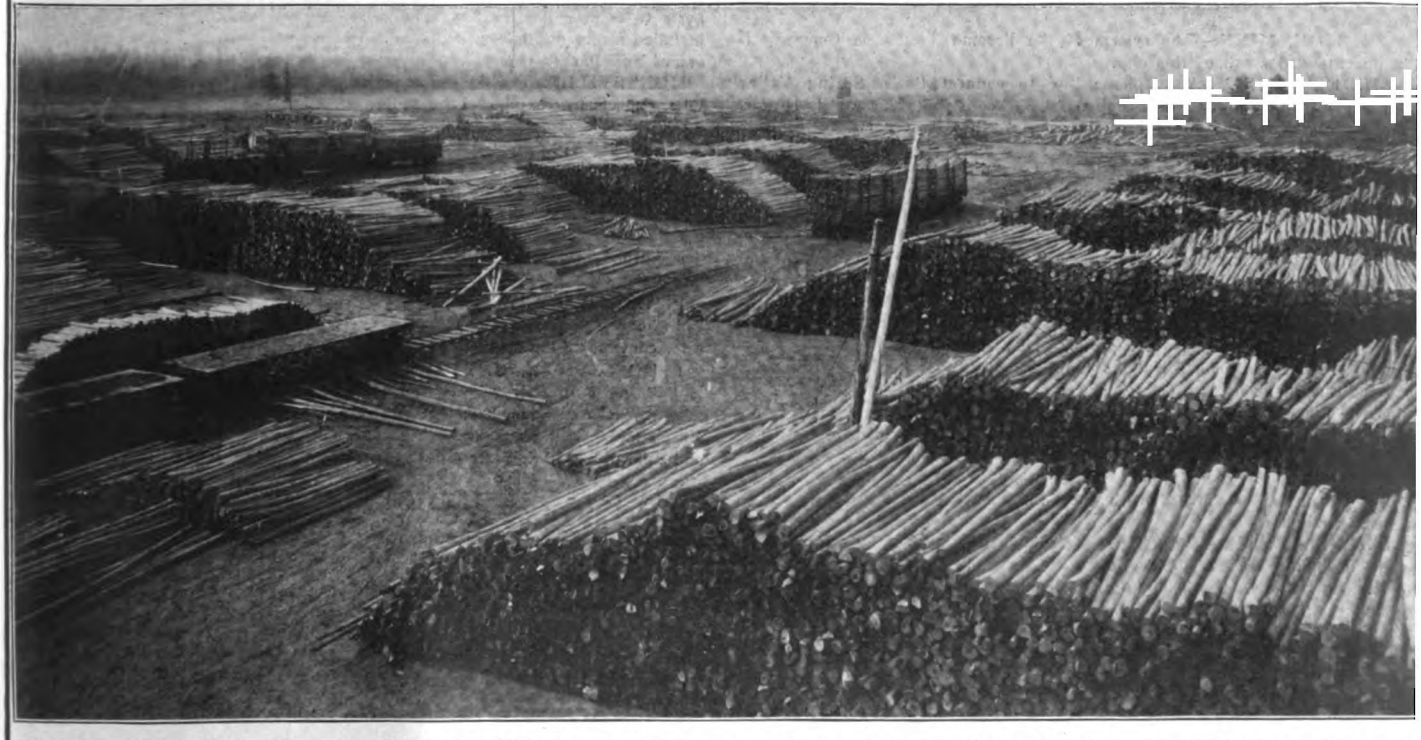
CHICAGO, ILL.

WHITE CEDAR POLES

DOESN'T THIS LOOK LIKE PROMPT SHIPMENTS FROM STOCK?

BRANCH OFFICES:
PHILADELPHIA
CLEVELAND
KANSAS CITY
LOS ANGELES
ATLANTA
WINNIPEG



VIEW OF OUR YARDS AT ESCANABA, MICH, TAKEN JULY 1ST, 1907—To keep our loading gangs busy during the dull summer months we are naming very attractive prices. Write us for delivered prices. We also handle chestnut and western red cedar.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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Condensed News Reports

PERSONAL.

THOMAS AINSWORTH has taken the position of manager of the plant of the Wabash Telephone Company at Paris, Ill.

A. M. BEARDSLEY, who was formerly a solicitor for the American Union Telephone Company and recently a special agent, working mostly from Harrisburg, has been assigned to the management of the division which has its headquarters at Carlisle, Pa.

LAWRENCE DEPEW, who has until recently been connected with the Ashland Home Telephone Company, Ashland, Wis., has resigned to take charge of the plant of the Independent Telephone Company at Spooner, as manager.

CARL FIELDS has been transferred from Mankato, Minn., to Staples, Minn., where he is in charge of the office of the Northwestern Telephone Exchange Company.

A. G. McGALIN has resigned the position of manager of the Citizens' Telephone Company of Houston, Tex., and is succeeded by Mr. D. D. Mintz, who was formerly in the maintenance department of the same company.

C. H. PARDEE has been appointed manager of the Danbury and Ridgefield (Conn.) exchanges of the Southern New England Telephone Company.

H. F. SNYDER, formerly division manager of the American Union Telephone Company at Carlisle, Pa., has been promoted to the management of Division No. 7, having headquarters at Williamsport and including the exchanges at Williamsport, Montoursville, Newberry and Muncy.

With the Builders

DEMOPOLIS, ALA.—A telephone line from Demopolis to Jackson, Ala., is being erected by the Government. It is expected that the line will be extended from Fort Morgan on the Gulf of Mexico to the head of navigation on the Black Warrior River.

LITTLE ROCK, ARK.—To facilitate the handling of trains the St. Louis, Iron Mountain and Southern Railroad has decided to install a private telephone system.

TRINIDAD, COL.—The Colorado Fuel and Iron Company is considering the advisability of installing a private telephone system.

LEESBURG, FLA.—The telephone system at this city, which was built and is owned by Dr. P. W. Butler, is to be extended to Tavares, the county seat of Lake county.

PAXTON, ILL.—A new exchange building is being prepared for the Paxton Telephone Company, in which a thoroughly modern system is to be installed, including new switchboards.

BRAZIL, IND.—Among the many improvements planned by the Brazil Farmers' Telephone Company are the installation of a new switchboard and the construction of lines to Esmond and other points.

LAMB, IND.—New lines are to be erected in Lamb by the Farmers' Telephone Company.

WESTFIELD, IA.—Many improvements in its plant are being made by the Westfield Telephone Company.

GRIDLEY, KAS.—The Gridley Telephone Company is extending its lines east and south of Gridley.

WASHINGTON, ME.—The newly organized Washington Telephone Company contemplates building a number of additional lines.

SHELBY, MICH.—A line between Shelby and Ferry is among the improvements planned by the Lake Shore Telephone Company.

ALPHA, MINN.—New lines in and about Alpha are being erected by the Dunnell Telephone Company, which intends to still further improve its system.

FOSSTON, MINN.—The system of the Fosston Telephone Company is being extended south of this city.

MEDINA, MINN.—A telephone line to connect Paris, Spring Valley and several other points with Medina is being constructed by W. J. Dwyer. He expects eventually to cover the entire northwestern part of Stutsman county.

NORFOLK, NEB.—A new exchange building is being erected by the Norfolk Independent Telephone Company, in which it proposes to install a thoroughly up-to-date plant.

RENO, NEV.—A telephone line which is to extend from the central office in Reno to Carson City, Virginia City, Dayton, Empire and Yerington is being constructed by the Truckee River General Electric Company.

FRANKLIN, N. H.—Many improvements and extensions in its plant are being made by the Citizens' Telephone Company.

FREDONIA, N. Y.—It is expected that the improvements to be made by the Fredonia Home Telephone Company at this city will represent an expenditure of about $10,000. A new switchboard is to be installed and the lines of the company materially extended.

LEONARDSVILLE, N. Y.—Work on the construction of a new telephone line to be owned and operated by Lynn H. Baldwin has been commenced. It is to extend from Leonardsville to West Winfield and connections are to be established with the Leonardsville Telephone Company's several branches.

THERESA, N. Y.—The Theresa Telephone Company is making preparations to extend its lines to Ox Bow.

RAMSEUR, N. C.—The Local Telephone Company, of Asheboro, is installing its system at Ramseur. A new switchboard is being installed at Star and new lines are also being constructed to Spero and Seagrove.

SMITHFIELD, N. C.—A modern strictly up-to-date plant has been installed at this city by the Johnson County Telephone Co.

DRAYTON, N. D.—New lines are being erected by the Local Telephone Company, of which Mr. Bartholomew is president, to St. Andrews, Minn., Bowesmont, Mattson and other places.

MANDAN, N. D.—A new and improved system is to be installed by the Mandan Telephone Company.

WYNDMERE, N. D.—Construction work on its system is under way by the Farmers' Rural Telephone Company and it is its intention to extend its lines west and south of this city.

CORVALLIS, ORE.—The plant of the Kings Valley Corvallis Telephone Company is to be enlarged.

NEW CASTLE, PA.—A new central energy switchboard is being installed at New Castle, Pa., by the Union Telephone Company, and its plants at this city and Sharon otherwise improved.

NEW WILMINGTON, PA.—The New Wilmington Telephone Company is preparing to connect its east and west lines with the line of the New Bedford Telephone Company near Pulaski, in Lawrence county, Pa. This will make a direct through line from Youngstown, Ohio, to Butler, Pa., and will have tributary to it ten exchanges with one thousand telephones on the country lines alone.

CAROLINA, R. I.—The Westerly Automatic Telephone Company is constructing a line from Carolina to Cross Mills.

CLEAR LAKE, S. D.—A number of new farmers' lines are to be erected by the Clear Lake Telephone Company, which will materially increase the subscribers' lists of this company.

INTERIOR, S. D.—The Interior Telephone Company is building a line from Kadoka to Philip. This will give connections to Pierre, Chamberlain and all points in the eastern part of the State. The company also plans to extend a line from Philip northward to Grindstone and other points in that section of the State.

MITCHELL, S. D.—A new exchange building is being erected by the Dakota Central Telephone Company, in which it expects to install a thoroughly modern plant.

DALE, TEXAS.—A telephone exchange and system is to be installed at this city by J. A. Ward and others.

FORT WORTH, TEXAS.—The Southern Telephone and Electric Company, which recently took over the Fort Worth Telephone Company, expects to erect a new exchange building at Fort Worth, in which is to be installed a new multiple switchboard. Lines are also to be built into Weatherford and Parker counties.

HUNTSVILLE, TEXAS.—The Triangle Telephone Company, of Huntsville, expects to extend its lines to Jewett, Ulman and Richards, and also to establish an exchange at North Zulch.

MARTINDALE, TEXAS.—A new exchange at Fentress has been installed by the Martindale Telephone Company.

SUFFOLK, VA.—Many extensions and improvements in its plant are being considered by the Atlantic Telephone Company.

CLINTONVILLE, WIS.—Lines are being erected in Clintonville by the Town Line Farmers' Independent Telephone Company, which will improve the service of the company in this city.

PRAIRIE FARM, WIS.—The Prairie Farm, Dallas & Ridgeland Farmers' Telephone Company, which has been extending its system at a rapid rate, contemplates the erection of one hundred miles of additional line.

BURGESSVILLE, ONT., CAN.—The Burgessville Telephone Company is building a number of new lines and is changing its whole system to metallic. Connections have already been established with Ingersoll and Harriettsville and plans are being considered for connections with Buffalo and other New York State cities.

UNDERGROUND.

PAXTON, ILL.—The Paxton Telephone Company expects to place a number of its wires underground in this city.

BROCKTON, MASS.—The Home Automatic Telephone Company is soon to commence work on the seven miles of conduit it expects to install in this city.

HASTINGS, MICH.—The Citizens' Telephone Company is placing some of its wires underground.

SAGINAW, MICH.—All telephone wires are to be placed underground in the business sections and certain residence portions of this city.

MITCHELL, S. D.—It is the intention of the Dakota Central Telephone Company to place its wires in conduits in the business portion of the city.

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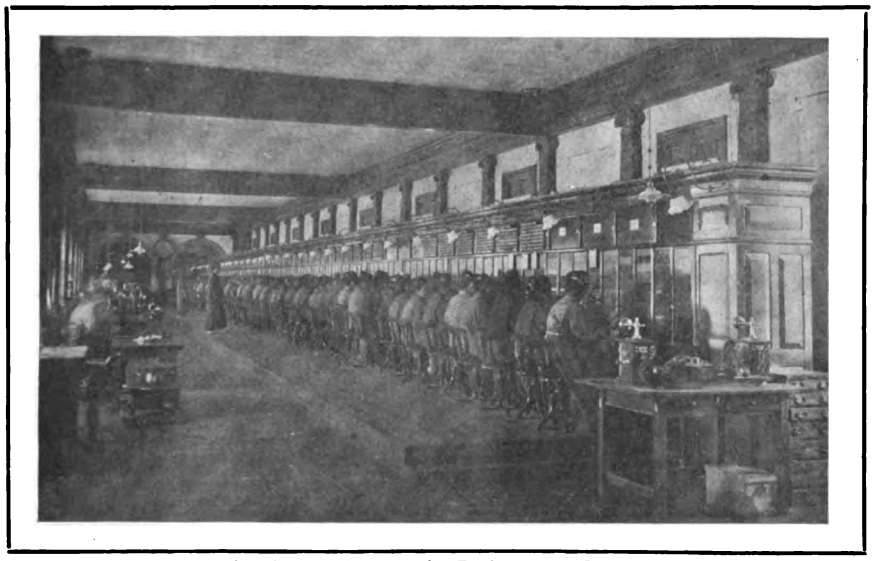
Notes on Telephone Development and Service in Japan

Article I—The Tokio Exchanges

By G. C. Hodge.

In Japan the telephone system is operated by the government. Telephone, postal and telegraph services are all under one head, being controlled by a group of officials who form what is known as the Department of Communications. Although this department has had only a few years in which to build up the telephone service it has made such progress as to put the Japanese system in a condition which makes it so much superior to others in the East that it is not for a moment to be compared with them. In fact the Japanese telephone men have adopted many ideas in connection with the building and operation of their plants which show that they could give valuable pointers to many Europeans in charge of telephone systems under government control. Their progressiveness, for example, in the use of telephones to aid in army manoeuvres is known to the whole world. It is acknowledged everywhere that in the late war with Russia they developed field telephone service to a point of greater efficiency than has been reached by any other army.



Operating Room of the Main Exchange at Tokio, Japan.

Tokio has, as would be expected, the largest telephone system of any of the Japanese cities, and the general features of construction and operation there seem to be typical of the practice throughout the country.

Out of a population of nearly a million people, about 15,000 are subscribers for telephone service. The lines are divided between five offices. The names of these offices, with the respective numbers employed in them and the numbers of subscribers whom they serve are as follows: Shitaya, with 120 operators and 2,500 subscribers; Shimbashi, which has 200 operators, serving 4,000 subscribers; Nainwa, where 170 operators take care of the lines of 3,700 subscribers; Bancho, having 1,500 telephones and 70 operators; and Main, with 160 operators handling connections from 3,300 stations. The totals of these figures, which are approximate for the number of subscribers, give 720 operators and 15,000 subscribers in the entire city. The rates are 66 yen (about $33) for either business or residence stations. All lines are individual, party line service being esteemed unsatisfactory.

Cleanliness is the most noteworthy thing which impresses itself upon a visitor to one of these central offices. The reason for the absence of dust is made apparent to the stranger by the request that he shall remove his boots before entering, which is courteously made at the door. Although a pair of slippers is provided as a substitute for the foot covering worn out of doors, the shape of these shoes is so peculiar that the writer has in some instances found it more convenient to walk in his stocking feet. The advantage of this Oriental custom of removing the shoes before walking upon the floor of a room is shown clearly enough by the results. The Japanese offices are by long odds the neatest the writer has ever been in, in any part of the world. It would gladden the heart of many a manager in this country to have his offices kept in the same condition. Except for their superiority in this respect the exchanges look very much like those to be seen in many parts of America.

Shitaya has a lamp signal switchboard manufactured in Belgium and has an ultimate capacity of 10,000 subscribers. All the other boards in Tokio and throughout the country are branch terminal multiple (magneto) boards manufactured in Chicago, with the exception of the boards in Kyoto, which are all central energy.

All the operators are girls. The endless succession of challenges, "Nanban" (number) is spoken in a well modulated tone of voice and all calls seem to be answered very promptly.

In the illustration showing the operating room in the Main Tokio office toll line boards, from which all long distance connections are made, can be indistinctly seen at the left. A large number of the lines which enter this board are equipped with coils for simplex connections, and are used for telegraph service as well as for transmitting speech.

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Distributing frames and protective apparatus are as a rule situated in the basements. The equipment used is very similar to the iron racks used in this country.

OPERATORS' STRIKE SETTLED AT SAN FRANCISCO.

AFTER a special meeting attended by 500 girls, the operators who were out on strike in San Francisco went back to work a few days ago. They reported at the general office of the company, and were assigned to such positions as were vacant.

The basis on which the strike was settled is reported to be as follows:

First—Increase of wages granted voluntarily by company shortly before strike, amounting to from $8 to $20 a month, will prevail.

Second — Working day will be eight hours, lunch time 30 minutes, with 15-minute recesses morning and afternoon.

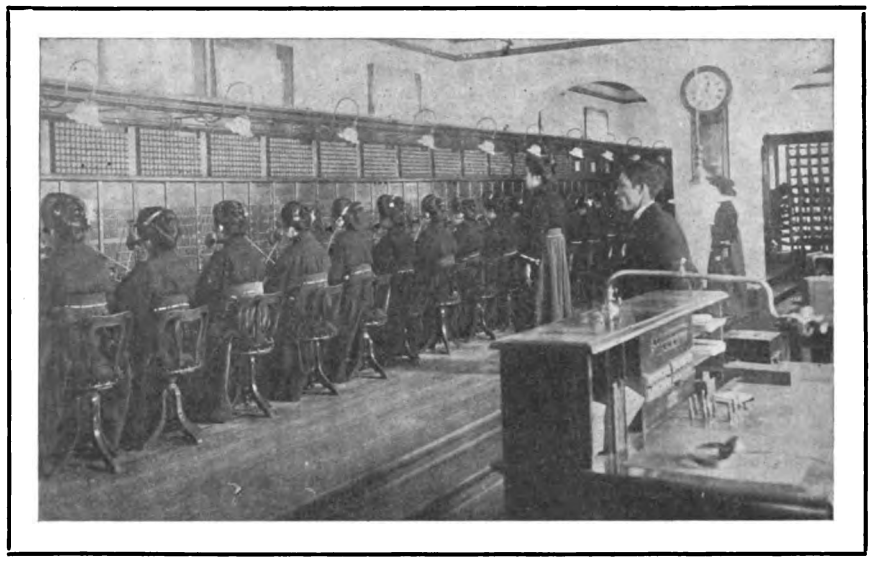
Third—Open shop will prevail in offices of the telephone company.

Fourth—Girls will apply individually for their positions, but no one, because of affiliation with the union, will be discriminated against.

Fifth—Men chief operators are to be withdrawn and women chief operators placed in direct charge of the girls.

Sixth—Operators will be allowed to continue in the organization and maintenance of the union.

General Superintendent G. P. Robinson, of the telephone company, said to the newspapers after the settlement:



Chief Operator, Supervisor and Part of the Staff of Subscribers' Operators at the Shimbashi Exchange, in Tokio.

"The operators who come back to work now will work under absolutely the same conditions as existed before the strike was called. The operators who remained faithful to the company and the recruits who joined our forces have been working under these conditions and we see no reason to make any change."

Miss Alice Lynch, president of the telephone girls, was equally as positive in her claims of advantages gained by her union in the contest. She said:

"Our girls went out to gain their right as Americans to have a union and they got it. From the start we have never advocated a closed shop. Neither did we ask particularly for increased wages. Our right to organize was our first demand and without its being granted we never would have returned to work. More than anything else besides our principal demand laid aside we wanted the men operators the company had placed over us to go, and this we got also. Our eight hour work day with the recesses which had been suspended are restored to us.

"The wages which the company had granted us in a desperate effort to prevent the strike were allowed to stand. The only point we lost was the right to demand a closed shop."

Both sides claim a "victory," but Miss Lynch seems to have had the last word.

The settlement of the strike of the operators means also that the electricians, who have been out in sympathy with them, will return to work. The people of San Francisco are rejoicing at the restoration of the service.

The Seasoning of Telephone and Telegraph Poles*

By Henry Grinnell.

EXPERIMENTS to determine with a close degree of reliability the amount of shrinkage which might be expected to occur at the end of different periods showed almost uniformly that the amount of this action was inconsiderable.

Table 8 gives the circumference at the 6-foot and 30-foot points for all the chestnut ploes, and also the per cent of shrinkage at the end of twelve months. From this table it is evident that the maximum shrinkage was less than 1 per cent, and that the average was but about 0.5 per cent for the butt and 0.6 per cent for the top.

Checking.

All wood when undergoing a seasoning process, either natural (by air) or mechanical (by steam, kiln-drying, etc.), checks or splits more or less. This is due to the uneven drying out of the wood and the consequent strains exerted in opposite directions by the wood fibers in shrinking. There is more checking in the wood of broadleaf trees than in that of coniferous trees, more in sapwood than in heartwood, and more in summer wood than in spring wood. Inasmuch as under normal conditions of weather water evaporates less rapidly during early seasoning in winter, wood cut in autumn and early winter is considered less subject to checking than that cut in spring and summer. Rapid seasoning, except after wood is soaked or steamed, almost invariably results in more or less serious checking.

Circumference class, inches.	When green. Butt, inches.	When green. Top, inches.	After 1 month. Butt, inches.	After 1 month. Top, inches.	After 3 months. Butt, inches.	After 3 months. Top, inches.
36.....	36.05	26.81	36.01	26.77	35.95	26.72
37.....	36.99	26.84	36.95	26.81	36.89	26.75
38.....	37.92	27.39	37.90	27.36	37.82	27.31
39.....	38.85	28.58	38.81	28.53	38.69	28.43
40.....	40.31	30.28	40.31	30.28	40.31	30.28
41.....	41.13	30.45	41.11	30.45	41.06	30.42

Circumference class, inches.	After 6 months. Butt, inches.	After 6 months. Top, inches.	After 12 months. Butt, inches.	After 12 months. Top, inches.	After 12 months. Butt, per cent.	After 12 months. Top, per cent.
36.....	35.90	26.68	35.87	26.67	0.50	0.52
37.....	36.83	26.70	36.79	26.66	.54	.67
38.....	37.75	27.28	37.73	27.22	.50	.62
39.....	38.60	28.38	38.58	28.32	.69	.91
40.....	40.25	30.21	40.13	30.19	.69	.63
41.....	41.06	30.39	41.00	30.33	.31	.39

Table 8. Shrinkage of chestnut poles.

The worst checking during seasoning experiments occurred at the Pisgah, N. C., station, where the poles were cut from com-

*Abstract from a bulletin of the U. S. Forest Service, concluded from issue of August 10.

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paratively young, rapid-growing trees. The trees were felled with axes and the chopping was carelessly done, so that in many cases the butts and tops were somewhat ragged and at times split. During seasoning, especially in summer, many of these poles checked and split badly at the butt and top, and in some cases pieces of wood of a width of several inches and of a depth of three to six annual rings curled up from the ends of the poles for a distance of several feet. Such pieces or slabs separated along an annual ring from the remainder of the pole, the point of separation being between the summer wood of one year's ring and the spring wood of the next. Had these poles been more carefully chopped or sawed the checking would probably have been slight.

Practical Advantages of Winter Cutting.

Winter cutting of poles has long been the general rule, since conditions continue to make it the best and cheapest season for the logger. Moreover, sap contains fewer nitrogenous substances in winter than at other seasons, and since fungi obtain much of their food from these substances winter-cut timber is least liable to attack from this source. Nor does the harder and denser wood found in summer and early autumn afford fungi as good a chance to lodge and develop as the undeveloped wood, immediately under the bark, which forms in spring and early summer. Again, winter-cut poles season more gradually, and at that time of the year the wood fibers shrink more uniformly, and checking is less serious. The latter consideration is, of course, more important than the matter of shrinkage.

Winter at the experiment stations where chestnut was cut is usually cold, with more or less snow, while summer is warm and comparatively dry. The effect of such a climate upon the seasoning of poles is that from the time of cutting until approximately air dry winter-cut poles lose water steadily; poles cut in autumn pass, during winter, through a period of comparatively slow seasoning, while spring and summer cut poles are completely stopped in their seasoning during cold weather and frequently even absorb moisture.

Though in nearly all cases winter-cut wood is heavier than wood cut at other seasons, yet after six or eight months' seasoning under ordinary climatic conditions it so nearly approaches the weight of the lightest that the difference in shipping weight is practically negligible.

In short, seasoning does not in itself, at least under the conditions which accompanied these experiments, furnish a conclusive argument for cutting in any one season, so that the practical considerations in favor of winter cutting are of determining importance.

Conclusions.

Below is given a summary of conclusions, the number of each corresponding to that of the question which it answers.*

(1) This, the main question involved in the experiments, is answered in Tables 1 to 6, which show approximately the rate at which chestnut and cedar poles may be expected to season under similar climatic conditions.

(2) Winter-cut wood seasons more regularly than that cut at other seasons, but does not, for many months, at least, reach as low weight as spring-cut wood seasoned equally long.

(3) In timber of approximately the same age and growth that cut in winter will have the greatest specific gravity, and that cut in autumn the least.

(4) The shrinkage of round timbers in air seasoning is very slight and may be disregarded.

(5) If poles are carefully cut, checking during air seasoning is comparatively slight. If split or shaken in felling, however, serious checking may result.

(6) From the standpoint of seasoning, spring and winter are the best times for cutting. Other considerations, such as custom, availability of labor, and susceptibility to decay, make winter cutting preferable.

Talking and Telegraphing Simultaneously Over the Same Line

Article II—The Composite Circuit

By N. C. Kissell.

TWO LINE WIRES are needed for a long distance telephone line to form a metallic circuit. Transmission of telegraphic messages is customarily carried on over a single wire, the circuit being completed through the ground. It follows that every metallic circuit telephone line has enough wires for two telegraph circuits. Each wire can actually be made to carry a two-fold burden without causing interference between the apparatus used for telegraphing by the elctrical currents used for talking and signalling for telephonic purposes and vice versa. The circuit used for this purpose and known as a composite circuit is shown in an elementary form in Fig. 2.

Considering the circuit first as representing only two telegraph lines the diagram shows a telegraph instrument placed at each end of each wire and connected to the "live" pole of a grounded battery common to both instruments at that end of the line. At each terminal an impedance coil is put in series with each line wire, between the line and the telegraph instrument. This impedance coil has a core containing a considerable amount of iron and is wound with a large number of turns of rather coarse insulated wire to a resistance of 50 ohms. Although the resistance to direct current is low the large number of turns of wire and the large amount of iron in the core make the impedance to alternating current high, and it is this quality which makes it possible to utilize the coil for the separation of telephonic and telegraphic currents. The precise reason why it performs this function depends upon a few simple principles of electromagnetic action and may be explained as follows:

An electrical circuit has a certain kind of inertia analogous to the inertia of water in a circuit of pipe, and this inertia of an electric current is called inductance. If an electric current in a circuit is made to change in value a portion of the electromotive force acting upon the circuit must be used to cause the current to change. The instant current is passed through the impedance coils a magnetic flux is set up in the iron core, and this flux will pass through all the turns of wire on the core. Now if a magnetic field is passed across a conductor an E. M. F. will be induced in the latter and this is what happens in the coil when current is turned on. Just as soon as the circuit is established the magnetic flux in the core, created by the magnetizing force of the current, changes from zero to a certain positive value. The lines of force thus created spread outward, cutting all the turns in the coil and induce in it an E. M. F., which is opposite in direction to the impressed E. M. F. which is causing the current to flow. Here then is found an opponent to the very cause of its existence. This induced E. M. F. only appears or shows itself while there is a change going on in the strength of the magnetic field. When the flux is changing from a zero to maximum value there is an induced E. M. F. in the coil in a direction

*See American Telephone Journal, page 54, issue of July 27.

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opposite to the E. M. F. which is sending the current through the coil. The difference between these two E. M. F.'s is the pressure which is actually causing the current to flow. When the current reaches a certain strength and remains so the magnetic flux will remain constant, and consequently there will be no opposing E. M. F. in the coil and the current will then encounter only the ohmic resistance of the coil.

If a current flowing through a coil is suddenly stopped the process is in a manner reversed, and the magnetic flux in the core then changes from a maximum value to zero. This change or decrease in the number of lines of force induces a current in the coil in the same direction as that which was originally passing through the coil. The action of the coil therefore tends to oppose for an instant any rise of the current in the coil and to temporarily build or boost up any falling current. The effect of this action upon a train of electric waves is shown graphically in

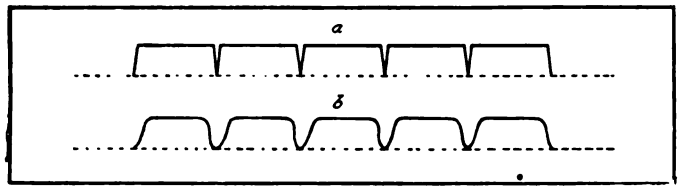

Fig. 1. Wave forms corresponding to impulses of direct current passing through line without inductance (a) and forms corresponding to similar impulses passing through impedance coils (b).

Fig. 1. At *a* is shown an electric wave which would pass over a line or through a coil containing no self-induction without change of form if the effect of capacity, which does not relate to the immediate branch of the subject discussed in this paragraph, is overlooked. Starting from zero it rises to its maximum value almost instantly, staying at a certain strength until the circuit is broken, then falling abruptly to zero. At *b* is shown a wave created by application of the same electromotive force as that shown at *a* to the terminals of the line, but in this case the form is drawn as it would appear when the wave passes through a coil having inductance. When the circuit is established the current, instead of rising to its full value instantly, does so gradually on account of the opposing E. M. F. induced in the coil pushing it back. When the circuit is broken the falling off in value of the current also takes place gradually on account of the induced current due to self-induction being at this time in the same direction as the applied E. M. F. This tends to build the wave up, or add to it, to prevent it from falling abruptly.

For the foregoing reasons a coil of wire having the property of self-induction, when placed in an electric circuit, tends to flatten the electric waves or, in other words, would have the effect of rounding off the corners of any sharp electrical impulses which are passed through it.

There is something else to consider in relation to a circuit containing inductance, and that is time. It takes a fraction of a second to start a current flowing in a circuit, stop it and start it again in the opposite direction. For instance, suppose E. M. F. is impressed on a circuit and stops and reverses itself before the current has had time to get started on account of the inertia (inductance) of the circuit. No current will pass in this event, simply because the E. M. F. is stopped and starts in an opposite direction before the current has had time to flow. The amount of time necessary for the E. M. F. to overcome the inertia of the circuit depends upon the inductance and resistance of the circuit. These facts make it possible to introduce a coil in a circuit which contains a large inertia or inductance and alternate the current so rapidly that none will be able to flow through the coil. A coil which will bring about this result is termed an impedance or reactance coil.

The coils placed in series with the line wires and between the telegraph instruments and the line in Fig. 2 have the effect of rounding off the sharp edges of the "Morse" impulses. Between these coils and the telegraph instruments are placed condensers, each having a capacity of six micro-farads connected to ground as shown in the diagram. This condenser has the property of absorbing a certain amount of electricity and, as placed in the circuit, this amount must flow before the current passes on. The amount of electricity which it will hold or the charge it can contain depends upon its capacity (measured in microfarads) and the E. M. F. of the charging circuit.

When, in operating one of the telegraph circuits the upper key at *A* is closed a current impulse starts from battery and passes through the telegraph instruments to point 1. Here it will suffer a delay on account of the condenser, as a certain amount of electricity must flow to charge this condenser before the current passes on. This will require a fraction of time, and the length of this interval depends upon the capacity of the condenser and the resistance of the circuit. From this point current will pass through the impedance coil *a*, where it suffers another delay on account of the self-inductance of the coil. From here it passes over the line, through coil *b*, through the telegraph instruments at station *B* to battery, to ground and back to battery at *A*. Not only is the current impulse thus made to suffer a delay by reason of the charging of the condensers on each end of the

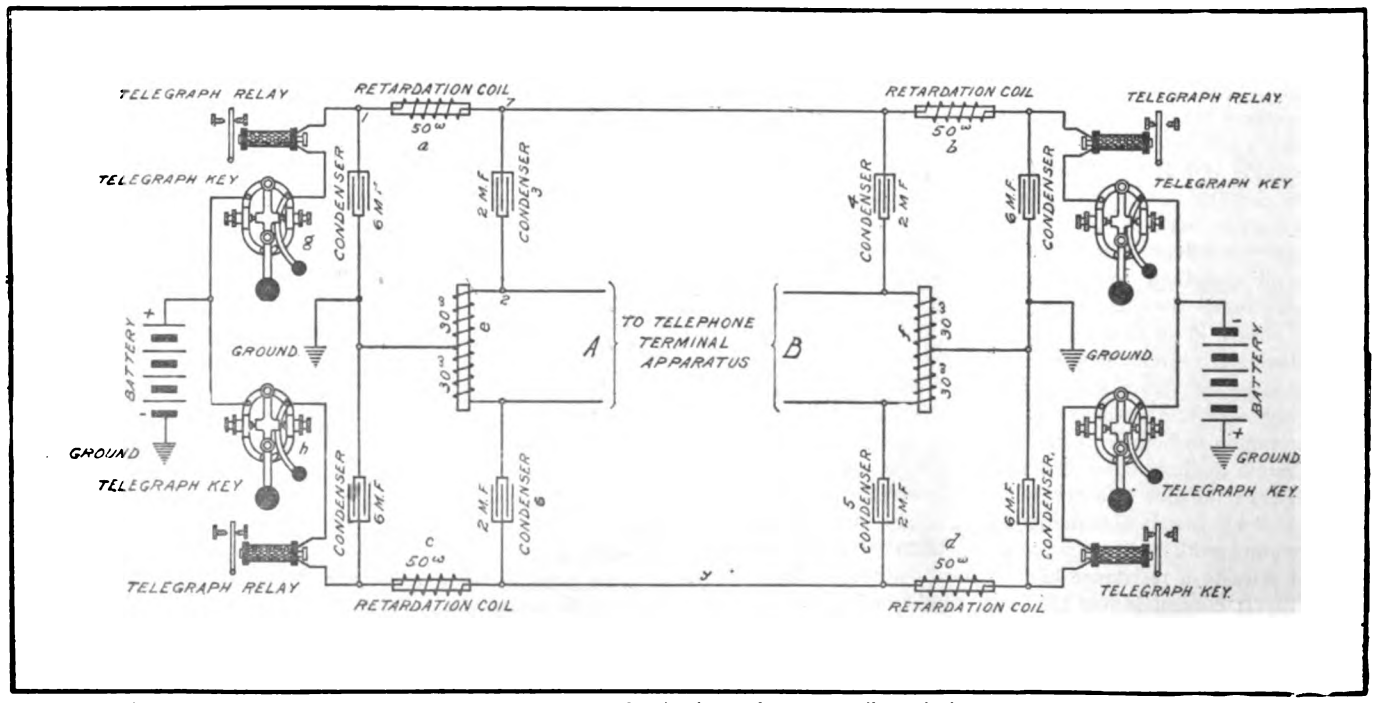

Fig. 2. Elements of composite circuit—two grounded telegraph circuits and one metallic telephone circuit worked on one pair of wires.

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line, but it has its wave flattened out on account of the inductance of the coils. In practice the key at *A* is opened almost as soon as it is closed. When the key is opened the coils *a, b* prevent the current from falling instantly and therefore, by placing the coils and condensers in the telegraph circuit, the sharp Morse wave is slowed down and altered in shape. The circuits on both sides of the telephone line being the same, of course their action is the same.

On the line side of each of the impedance coils in the main circuit is bridged another coil connected to the line wires by means of two condensers of 2 M. F. capacity each, as shown in diagram. Directly across the terminals of the latter coil two taps are taken off, and these lead to the telephone circuit. The action of the latter coil in the circuit can also be explained in simple terms.

When *A* is transmitting speech to *B* the waves of comparatively high frequency talking current are choked back by the coil *e* on account of its high self-induction and pass through the condensers 3, 6 to the line wires in preference. Here the waves are again choked back by the coils *a* and *c* and prevented from passing through the "Morse" instruments, which, if ohmic resistance alone were considered, would seriously shunt the telephone line. The waves pass over the line wires *x* and *y* and, upon reaching the other end of the line, they pass through the 2 M. F. condensers 4, 5 to *B's* instrument, being confined to this path by the impedance of the coils *b, d, f*. Therefore at a given instant the high frequency talking current from *A* passes to point 2, through condenser 3, line wire *x*, condenser 4, through *B's* instrument, condenser 5, line wire *y*, condenser 6, back to *A*. The ohmic resistance of each of the coils *e* and *f* is 60 ohms, and they are connected at their centres to ground. Their action is to equalize any difference of potential between the line wires and to prevent this levelling of potential from passing through the telephone instruments. If in their absence the keys *g* and *h* were open and then key *g* closed, key *h* remaining open, the telegraph current upon reaching point 7 would pass over line wire *x* and also through condenser 3, telephone at *A*, condenser 6 to the other line wire. This would cause an intense click in *A's* instrument. As the circuit is actually wired coil *e*, being of low ohmic resistance and offering very little impedance to low frequency currents, shunts out practically all of the current that would tend to pass through the telephone instrument. This would also be the case if the batteries used on the two-line wires for "Morse" operating were not the same. For instance, if the voltage of the "Morse" battery on one wire was 110 volts and on the other 80 volts there would be a difference of potential between the line wires of 30 volts, providing the current was in the same direction in both wires. This difference of potential would be constantly shifting and equalizing itself through the telephone instruments if provisions were not made to shunt them out.

In the practical operation of a composite circuit it is very desirable that the currents flow in the same direction in both line wires and be of the same strength and voltage. If a line had 110 volts positive potential on one wire and 110 volts negative potential on the other as both batteries are grounded there would be a difference of potential of 220 volts across the two line wires, which is rather a high voltage to operate through ordinary telephone cable and wiring. If the voltage used on both line wires is the same and the current flowing in the same direction in both, with sets of terminal appratus of the same resistance on each side of the line, there will be practically no difference of potential between the two line wires when both keys are closed. The best conditions for practical work and the maintaining of homeogeneity between the two line wires in operating composite circuits will be taken up in another article.

SOUTH DAKOTA FINDS ITS TELEPHONE PROPERTY HAS INCREASED $223,000 IN VALUE DURING THE PAST YEAR.

THE State Board of Assessment of South Dakota has increased the valuations of telephone property over the amount of the returns for the last year by $223,000. Most of the amount of this increase was placed upon local exchanges and toll lines which are revenue-producing property. In the case of many country exchanges and mutual systems the reports filed showed that no toll business was done and the expenses were kept up by assessments upon the members. Many instances of reduction in the valuation of properties in this class may be noted in the report of the board.

The total figures show the telephone property to be valued at $863,000 at the present time. The system of the Dakota Central Company, which is the largest in the state and is meeting with much opposition because of its connection with the Bell interests, is assessed at $313,000, this amount being larger by $58,000 than its assessment of last year, owing partially to the increase brought about by purchases.

The South Dakota telephone commission has been reorganized by the selection of State Treasurer C. H. Cassill as chairman, and W. B. Edge, of Centerville, secretary. While the commission will be hampered by the failure of the legislature to appropriate an expense account, the members expect to get through with as much of the work presented to them as possible and take their chances on the next legislature appropriating money to reimburse them for their expenditures in their work as telephone commissioners.

How to Make a Handy Wire Reel at Low Cost

By Lynn W. Shipman.

WHEN an exchange manager has occasion to do some line construction at a distance from the central office and the amount of material necessary for the job does not warrant using the time of the entire construction gang and the heavy double team construction wagon a small, substantially built, light pair of reels can be very conveniently used. These can be economically constructed by anyone who has a little mechanical skill in accordance with a plan, which the writer has found to give good satisfaction. Fig. 1 shows the completed stand with one of the pair of reels mounted thereon.

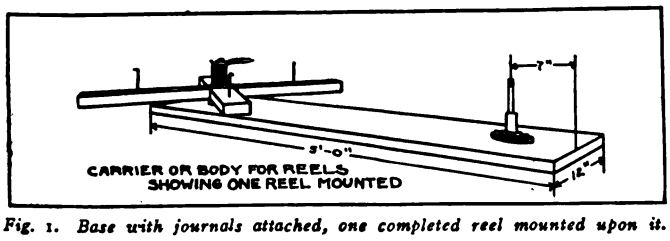

Fig. 1. Base with journals attached, one completed reel mounted upon it.

To an oak plank two inches thick by twelve inches wide and five feet long a tapered axle or journal of cast iron *A* (Fig. 2) is fastened seven inches from each end. The reel is preferably made from the same kind of wood (although any hard wood will do for either) by mortising two pieces two inches thick by four inches wide and thirty-four inches long and bolting them together with bolts through the bearing casting *B*. The hole in the casting *B* is made tapering to fit the tapering part of the journal *A*. The brake shoe is also made tapering with a flat interior side *G* which fits against a corresponding plane surface on the journal and prevents its turning with the reel. The spiral spring *D* and the adjusting nut *E* complete the parts necessary, aside from the spreaders which are made of double end bolts bent over and fastened through holes bored in the reel arms. The customary

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guard is put on the reel to strengthen the arms and prevent the wire catching under them, but is not absolutely necessary.

The material which enters into this construction may all be secured locally at a low figure. When put together as described it makes a strong, light reel with a good bearing that will insure smooth running and good wearing qualities. This outfit weighs

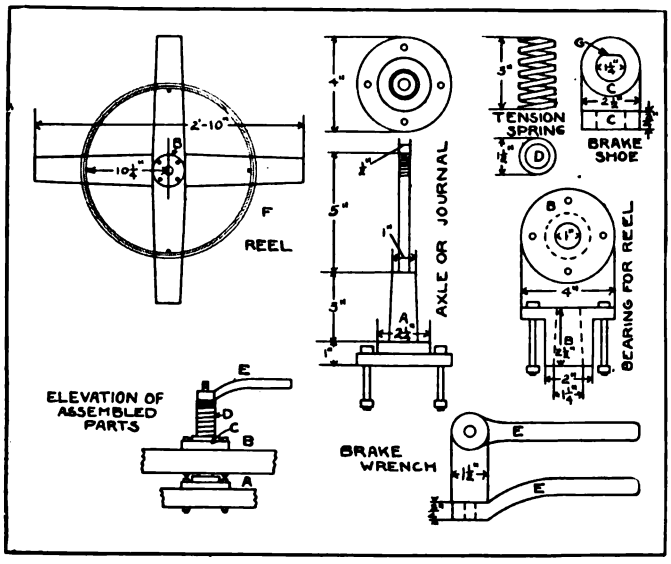

Fig. 2. Parts entering into the construction of a single reel.

and costs only as much as one of the ordinary pay-out reels. The cost will run from five to eight dollars, according to the skill of the maker and the proximity of a foundry or a machine shop.

When stringing wire it can be easily fastened to the wagon box, or if put on the ground will not tip over and tangle up the coil if the wire gets caught, as often occurs with some types of reel.

The writer has had two pair of these reels in use for some time, giving excellent satisfaction in every respect. They are found to be particularly useful in cases of long hauls for small jobs, as they can be thrown on top of a loaded one-horse wagon and carried out into the country or wherever needed without overloading the wagon. Owing to their lightness and strength they will stand much harder usage than some of the more elaborately constructed standard reels.

GOOD WORDS ABOUT THE SANDUSKY TELEPHONE PICNIC.

THE joy of the reporter at Sandusky, Ohio, who went on the Sandusky Telephone Company's picnic to get an item for his paper, the Star-Journal, was shown in every line he wrote. Here are a few quotations that show the spirit of the occasion as he saw it, and undoubtedly shared in it, too:

"The 'hello girls' of the Sandusky Telephone Company went to Put-in Bay on the Arrow, Wednesday morning. So did the officers of the company, the directors, the male employes and the families of those who had families to take. It was a jolly party of 60 persons, and, as they started, there was determination to have a good time.

"All of the employes who could possibly be spared were taken on the trip. Those who had to remain behind to keep the switchboards running will be relieved early in the evening and go to Cedar Point for their outing.

"General Manager J. K. Johnston had charge of the Put-in Bay party and was busy as a nailer seeing that everybody got aboard the boat and was made comfortable. 'We are out for a good time, and intend to have it, regardless of weather or anything else,' he said.

"The battle cry of the occasion was: 'Rah! Rah! Rah! The Independent Telephone Company. The one that's right. What's all right? The Sandusky Telephone Company. Rah! Rah! Rah! Look for the shield.'"

General Manager Johnston has expressed himself as being very much pleased with the results of this excursion. He says: "The employes had a good time, and the excursion was a good advertisement for the company, too. This latter feature was especially useful when the competition we have in this city is taken into consideration. Such an outing costs very little, considering the benefits to be derived from it. I think that more telephone companies would be justified in giving picnics or outings, not only for their advertising value, but because they strengthen the loyalty of employes, and cheer them up so that they go back to work with renewed enthusiasm."

SASKATCHEWAN MUNICIPALITIES PUSHING ARRANGEMENTS FOR GOVERNMENT TELEPHONES.

AT the convention of municipalities of the Province of Saskatchewan, held at Regina, a strong discussion took place in favor of government and municipal ownership of telephones. During the argument the Bell company received a considerable amount of abuse. Part of this abuse was, however, based upon a misapprehension as to the cost of service in systems of different sizes. It was pointed out by one of the speakers that the company, instead of reducing its rates with the increase of business had, in many cases, ordered an advance. During the meeting a resolution put to the delegates and carried without a dissenting voice states

"That this convention desires to place on record the fact that it objects to the excessive rates charged for the use of telephones by the Bell company on the grounds that, instead of decreasing with the increase in the volume of business done by them they have increased charges, and the convention urges upon the provincial government that the convention is in favor of government and municipal ownership of telephones within the province."

After the convention several members of the government were spoken to on the matter, and it is understood that at the next session efforts will be made toward the establishment of a system of government owned telephones similar to that now being built by the governments of Manitoba and Alberta. Francis Dagger, telephone expert for the Province of Manitoba, has been engaged to perform similar work for Saskatchewan, preparing for government ownership.

Maintenance and Construction Force of the Sandusky Telephone Company.

The Picnic Party at Put-in Bay.

On the Boat; "Look For the Shield" in a Prominent Place.

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Important Telephone News

NORTH CAROLINA INDEPENDENTS HOLD ANNUAL CONVENTION AT SALISBURY.

MEN from all the larger Independent telephone companies in the State of North Carolina, and representatives of many of the smaller concerns, got together on July 25th at the second annual meeting of the Independent Telephone Association of the State, which was held at Salisbury. A discussion of many affairs of general interest to the operating men consumed a large part of the time, and resulted in bringing out much information useful to the members of the association. The principal topic discussed was the matter of building Independent toll lines to a great many of the plants which now have no means of reaching one another. It is hoped that definite results along this line may soon be brought about.

The resolution adopted by the International Independent Telephone Association condemning any affiliation or connection of Independent companies with the Bell company was adopted and strongly endorsed by members of the association. B. W. Leavitt, of Southern Pines, was re-elected secretary of the association.

CANADIAN ASSOCIATION TO MEET SEPTEMBER 4 AT TORONTO.

MEMBERS of the Canadian Independent Telephone Association are to come together at Toronto for their annual convention on September 4th. The officers of the association announce that their programme will be very interesting and matters will be discussed which will be of great importance to all Independent telephone companies throughout the Dominion.

The convention is being held during the Toronto exhibition so that low railroad and steamboat rates will be in force through all parts of the United States. Telephone men in all sections of the United States, and particularly the officers of Independent telephone organizations, are most cordially invited to attend the Canadian meeting.

OHIO INDEPENDENTS UNITED IN DETERMINATION TO RESIST BELL MERGER OFFERS.

NEVER in the history of the Ohio Independent Telephone Association has there been so large an attendance as there was at the special session just held in Columbus. More than 350 men were present, and in regard to the most important matter discussed the almost unanimous sentiment was expressed by the rallying cry, "No compromise with the Bell companies, either in the long distance or the local field."

President Frank L. Beam of Mt. Vernon opened the meeting and several addresses were made by members before the report of the resolutions committee was read. Harry M. Daugherty, a director of the Columbus Citizens' company, spoke on "Why Is Independent Telephony So Successful?"; W. Gilbert Thompson of Hamilton, James B. Hoge of Cleveland and H. B. Folsom of Circleville discussed "Why Is Competition Desirable in the Telephone Business?", and A. Hess of Sidney told of the enforcement of the general laws of Ohio in reference to the telephone business.

After the addresses the association unanimously adopted a resolution denouncing a compromise with the Bell company, in the following terms:

"*Whereas,* It is the sense of the Independent telephone companies of Ohio, composing this association, that its members refuse to enter into any contracts or arrangements whereby competition is eliminated and that all violation of law arising from such arrangements or contracts will be prosecuted by this association,

"*Resolved,* That the executive committee is hereby authorized to take such steps as are necessary to carry this resolution into full effect."

This resolution means that the association will invoke the Valentine Anti-Trust Law against any company which enters into a contract with the Bell company for the retirement of the latter from the local field in exchange for the long distance business of the Independent company.

After the delegates had eaten luncheon the subject of advances being made by the Bell companies to the Independents was again taken up and, after a long discussion, the following resolution was unanimously adopted:

"*Whereas,* Certain Independent telephone companies have violated their contracts with the United States Telephone Company by permitting unauthorized connections and interchange of business prohibited thereby, to the serious injury of every Independent telephone company in Ohio, or interchanging business therewith,

"*And, whereas,* The maintenance of competition in long distance telephone business is deemed necessary for the best interests of the companies as well as the public,

"*Therefore, Be it resolved* by the Ohio Independent Telephone Association in convention assembled that we deem it the duty of the United States Telephone Company to enforce its contracts wherever violated, and, be it further resolved, that we demand that the United States Telephone Company bring suits, if necessary, against all companies violating their contracts with it and that this association pledge its unqualified support in the prosecution of such actions."

It is said the Independent long distance company will bring suits for violation of contracts against several Independent companies and the adoption of this resolution means that it will have all the moral backing of the association behind it in any legal proceedings it may take.

TEXAS COMPANY KEEPS THE LONG DISTANCE IDEA BEFORE THE PUBLIC.

THE Beaumont Telephone Company, of Beaumont, Texas, believes not only in reminding people that it gives first class service but is able to get its subscribers in touch with all the most important cities and towns in its vicinity. Everyone with whom the company does business by mail has an opportunity to read a notice, based upon correct advertising principles, in the terse sentence "Ask about our long distance connections," which appears in prominent red type upon the fold of every envelope.

CONSOLIDATION OF INDEPENDENT INTERESTS IN TEXAS.

THE Southern Telephone & Electric Company, which has its headquarters at Fort Worth, Texas, recently completed the purchase of the Fort Worth Long Distance Company and the Home Telephone Company of Weatherford. By this purchase the company has acquired an exchange of 600 lines, with 40 miles of copper circuit toll lines. Condemnation proceedings have been started to obtain rights of way from Fort Worth to Amarillo, 300 miles; Fort Worth to Hillsboro, 55 miles, and Fort Worth to Abilene, 160 miles. This will put the company in connection with other strong Independent interests.

Mr. E. L. Swain, formerly general manager of the Home Telephone Company, of Los Angeles, is now general manager of the Southern Telephone & Electric Company. H. L. Edwards, contract agent, and E. A. Olds, general superintendent of construction, have arrived in Texas and will at once proceed with the new work.

In connections with the operations of this company financial assistance will be furnished by the Mercantile Bank & Trust Company, a newly organized concern, which is to handle the telephone company's securities in connection with a general banking and trust business. Mr. F. J. Norris, a well-known banker of Los Angeles, is named as president of the bank. J. N. O. Rech and E. L. Swain are among the directors.

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Editorial Opinions

LOW RATES AND LOCAL SERVICE.

RECENT occurrences in Wisconsin, where the Bell company has been endeavoring to do away with Blake instruments and "grounded" lines, and incidentally raise rates, according to the plan which has become so familiar from its repetition in countless cities and towns throughout the country, have demonstrated anew that very many people cannot be depended upon to furnish a telephone company with any more than a minimum revenue. Although the Blake instruments, when properly adjusted, allow the user to talk over considerable distances, it is extremely doubtful if, under the conditions which accompany their operation in the hands of the Bell companies, the subscribers would find the quality of transmission on a very long toll connection satisfactory. The fact that they continue to use the Blake instruments, and strenuously resist any demand for their removal, is not alone an indication that the subscribers object to the raise in rates as a matter of principle, but tends to show, also, that the quality of service they have received is satisfactory to them considering the low prices which they have paid for it.

As a matter of fact, telephone users can be properly divided into two classes; those who are able to use the service frequently, and by so doing make it either earn money for them, or increase the amount of time available for earning money in other ways. To such a class of subscribers the cost of the service, if well below the value of the benefits derived from it, is not so material. They prefer to pay a higher rate for an improved quality. The rapid extension of the service, however, brings into telephone systems every year an increasing number of subscribers, who, while realizing the benefits of the service to them, must limit the price paid for it to a comparatively low figure. This necessity arises from the fact that their incomes are not large, and are fixed in amount. To this class of subscribers the utility of the service is much more limited than to those whose interests are more varied, so that an advance in price which will nearly double the cost, such as is exacted on the removal of Blake instruments and the installation of the "long distance" type on metallic lines, is almost surely an occasion for the throwing aside of the instruments.

Many telephone companies which receive flat rate payments are sorely puzzled by the problem of obtaining adequate compensation from the large users of service, while offering to the people who can afford only a limited amount an opportunity to obtain it at a reasonable price which will still afford a profit to the telephone company. Heavily loaded party lines at first seemed to solve the financial difficulties, but the unpleasant reactions from the service standpoint which they introduced have made them a cause of serious annoyances in many places. It seems likely that companies which are attempting to work out the solution along these lines, and still maintain a flat rate, are dealing with too many varying and opposing forces to enable them to reach a wholly satisfactory conclusion. The results are much more likely to come from an adjustment based on the measured rate principle.

THE PRINCIPLES OF SIMULTANEOUS TELEPHONE AND TELEGRAPH OPERATION.

MARKED advances in the productive efficiency of long distance lines have been brought about by the development of apparatus and operating methods which permit the simultaneous transmission of several messages over a single telephone line. So satisfactory have been the results from the use of this class of circuits for simultaneous telephony and telegraphy that telephone companies are able to plan for the introduction of telegraph business without anticipating the slightest objection on the part of telephone users, as there is, when lines are properly maintained, not the slightest interference with the transmission of speech. The financial returns for the telegraph business are almost without exception found to be satisfactory, as the original investment necessary for adapting circuits to telegraph transmission is insignificant compared with the cost of erecting separate lines. The benefits derived are twofold inasmuch as the telephone company is enabled not only to make a direct profit from taking on new business, but to reduce to a certain degree the amount of time consumed in the transmission of its own business which interferes with subscribers' use over the telephone wires.

The direct income is derived from the transmission of telegraph messages, or, in accordance with the more commonly adopted practice, the lease of the right to use the lines for telegraph service to outside parties. Much of the official business of a telephone company is now transmitted by telegraph, leaving the metallic circuit free for use by outsiders who pay tolls for talking. In view of these very evident advantages from the adoption of systems for making circuits carry two distinct loads simultaneously, and the ease with which telegraph business to keep the "extra circuits" working through a large part of the day is obtained, it is not surprising that within the past three years the number of lines so employed has enormously increased. Telegraph circuits are now working over telephone lines on nearly all the important routes between large cities, and the idea is being rapidly extended to include connections to many places which have only one or two toll lines.

Owing to the rapidity of the development of this branch of business the number of men required to handle it has at times been inadequate. Many persons have been called upon to take up various branches of this work without having even a knowledge of its elements. Even in companies where the work has been carried on for some time on a rather large scale a very fair proportion of the employees in engineering, operating and maintenance departments have not had an opportunity to acquire a knowledge of the fundamental principles which are the basis of modifications which adapt a telephone circuit to the transmission of telegraph signals.

The series of articles by Mr. Kissell which is now appearing in AMERICAN TELEPHONE JOURNAL offers a good opportunity to men in all departments of telephone work to familiarize themselves with these principles and the methods which have been adapted to fit them to practical conditions. The writer has adhered to a definite plan of reducing expressions of many phenomena, which have been considered by many persons to be somewhat complex, to such simple terms that a person well grounded in the facts of elementary electricity and magnetism can obtain a clear idea of the way they fit into the scheme of the practical circuits now in use.

The advantages to be gained from a careful reading of these articles are believed by the Editor to be such as to appeal not only to those who have to do with the practical operation of such circuits as are described, but also to those who wish to acquire a general knowledge of what is becoming such an important section of the work carried on by telephone companies. The writer of the series, having had a most thorough experience in the class of work he has described, has attempted to restrict his articles to the most assential things, in order that the plan to secure clearness and simplicity of treatment might not be marred by the introduction of many details not closely related to this main proposition. It is realized, however, that practical men who read the article will think of many questions pertaining to the subject which might well be answered from an authoritative source. In order to make the articles carry the fullest benefit to those interested in them arrangements have been made to answer promptly all technical questions which are suggested by the text of the article, or by the experiences of men who are called upon to consider the details of design and operation of circuits similar to those described. Questions on this subject addressed to the Editor of AMERICAN TELEPHONE JOURNAL will receive answers worked out as carefully as the descriptions of the main principles embodied in the circuits treated in the articles which are now being published.

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Legal Opinions and Decisions

CONDUCTED BY A. H. McMILLAN.

MISSTATEMENT OF OCCUPATION IN DIRECTORY.

Being in undue haste, we have unintentionally, without the permission of, and unknown to the injured party, listed a man in our directory as a gardener when he should have been listed as a stockman. He claims that it was belittling, and is very wroth. I hardly think that he will claim financial injury. He threatens prosecution unless the directories, even those already distributed, are corrected at once.

What can he do if we make a reasonable effort to correct the error by mailing a correction to each of our subscribers.

What can he do if we do nothing? J. L.

THE man whose name was given in your directory as a gardener instead of a stockman can do nothing to injure the company if it makes a reasonable effort to correct the error by mailing a corrected copy to each of its subscribers. We do not see how he could prosecute the company, even if it did not correct the copies of its directory already distributed. The only ground upon which there would be any prosecution of the company would be that its directory had libelled him. Libel is defamation published by means of writing or anything that is the object of the sense of the sight; see Townsend on Slander and Libel, section 21. It is certainly no defamation of a man to say that he is a gardener, even if he actually occupies in the world the exalted position of a stockman.

He might possibly hold the company liable for damages for breach of contract in not publishing his occupation in its directory as he gave it, this being upon the theory that the company impliedly contracted to publish his occupation in its directory as stockman.

CONTRACT GIVING BELL COMPANY EXCLUSIVE PRIVILEGES IN A HOTEL IS INVALID.

THE Supreme Court of New York has held that a contract giving one telephone company the exclusive privilege of maintaining a telephone system and giving telephone service in, to and through a hotel is invalid, because against public policy. This decision was made in relation to the Yates Hotel at Syracuse, New York. The facts are that the proprietors of the hotel, desiring telephone service therein, applied to the Central New York Telegraph & Telephone Company, which is a licensee of the Bell telephone company. A contract was entered into for nine years which contained provisions to the effect that, in consideration of the telephone service which the hotel was to receive under contract, the company was to have the exclusive privilege of maintaining a telephone system in the hotel, and that no other company was to be permitted to do any business there during the lifetime of the contract. About a year ago the proprietors of the hotel wished to install the telephone service of the Independent Telephone Company of Syracuse, and made a contract with it for that purpose. The Central New York Telephone & Telegraph Company thereupon commenced suit for injunction, asking that the proprietors of the house be perpetually restrained during the lifetime of the contract from permitting the installation of any other telephone service in the hotel. The defendants then moved to have the Bell contract declared illegal so far as it tried to create any exclusive privilege, on the ground that such a contract was void, as against public policy. When the motion was originally heard the court denied it, but upon a reargument changed its decision and held the contract invalid in the respects indicated and vacated the injunction in so far as it tried to defeat the right of the Independent Telephone Company to install its system and give its service to the hotel.

The court, in its decision, discussed at length the law concerning public policy as its affects contracts in restraint of trade, saying that contracts which partially restrained trade are not objectionable so long as the restrictions are only such as to afford a fair protection to the party in favor of whom they are given, and are not so large as to interfere with the public interests. Discussing the validity of a provision that a patron will not patronize a rival corporation, the court said: "Telephonic communication has become a necessity in commerce and business, and while there are disadvantages in two systems in one territory, a monopoly of such a common necessity with the lessened incentive to good service and the best equipment which follows is a greater evil." The court therefore found the contract to be against public policy, and held the particular clause under discussion to be void. Central New York Telegraph & Telephone Co. vs. Averill, et al, Supreme Court.

ASSESSMENT OF AN ADJOINING LAND OWNER IN MAINE.

What is the right of a land owner, in front of whose property the telephone company erects its lines, as to recovering damages alleged to be sustained by him for deterioration of his property? We are a corporation organized under the Maine laws, and have proper franchises and authority for doing business in the State, County and City. A. F. Co.

THE rights of an adjoining land owner are regulated by statute in Maine, such regulation existing only, so far as we know, in that State and in Massachusetts. It is there provided that an adjoining land owner, whether he owns the fee to the highway in front of his premises or not, if his property is injuriously affected by the occupation of the ground or air by posts and wires erected in the highway, may apply to the mayor and aldermen, or selectmen in six months to have them assess his damages. It becomes their duty to view the property, and assess the damages in writing, such damages being thus recoverable from the telephone company in an action of debt. Rev. Statutes of 1903, Ch. 55, Section 18.

EQUAL RIGHTS IN NEW ENGLAND RAILROAD STATIONS.

AT the last session of the Vermont Legislature an act giving to all telephone companies having 500 or more subscribers equal rights in the railroad stations of the State was passed. The Vermont People's Telephone Company of Orleans County immediately applied to the Boston & Maine Railroad Company for permission to install at Newport instruments in its stations, as provided by this law. This complaint was refused. A suit to compel the granting of the privileges asked was started and heard at the May term of the County term at Newport at which the contention of the complainant was sustained, and judgment rendered in its favor. The case will be taken to the Supreme Court, where the railroad company will seek to have this decision reversed.

The decision of the higher court ought not to differ from that of the lower. A railroad company has no more right to prescribe the company over whose line people should do their telephoning, than by whose public carriage they should arrive at and depart from a station.

RESPONSIBILITY FOR ACCIDENT CAUSED BY CONTACT.

The accident described in the article appearing in AMERICAN TELEPHONE JOURNAL issue of August 3, page 75, under the caption "Responsibility for death of horses," took place at a spot where a messenger wire belonging to the telephone company hung about two feet below electric light wires. The electric light people had their lines up first. Who is responsible in case their lines come in contact with those of the telephone company in a case like this? M. W. B.

SO far as the owner of the horses is concerned the responsibility of the telephone company and the electric light company is probably joint. The accident might have been avoided had either company erected a guard wire between the lines of the electric light company and the telephone wires. Such wires, however, need be erected only when circumstances render it advisable for safety; Aument vs. Pennsylvania Telephone Co., 28 Pa. Super. Ct., 610. Therefore, if you can show that guard wires would not have been advisable in this instance, you may avoid liability entirely.

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Telephone Theory and Practice

ON CATCHING LIGHTNING.—(900.)

Will you please tell me if lightning can be stored up in a storage battery? I think that will soon be done. We had our line struck last night and it burned out some telephones on our line and melted the wire at the telephone and the line too. We had our telephone shut off so that it did not go in the box. The line wire was burned in two and a pole split. Could this be stored up or not? Would like to know what you think of this. C. C. S., Texas.

We believe that it will be interesting if we first explain the nature of lightning. Early observers perceived that lightning and thunder were similar in their nature to the light and cracking of an electric spark. Franklin proved an exact similarity between the two discharges in giving light, heat, speed, noise, fusion of metals and the rending of bar conductors. He succeeded in conducting electricity from the clouds by means of a kite, having attached to it a pointed wire. The kite was held by ordinary pack thread, having a key at one end, to which was fastened a piece of silken cord to insulate it from the hand. At first he was unable to obtain results, but after a rain storm had wet the thread, and made a conductor of it, he obtained sparks sufficient to charge a Leyden jar.

Other investigators have pursued this subject and from their experiments it has been found that the atmosphere always contains electricity, usually positive, but sometimes negative in nature.

The amount of positive information available as to the cause of lightning is by no means large. It is admitted to be a static discharge, probably caused by evaporation, or by the friction of water and air, as rain, hail or passing clouds. As the earth possesses zero potential, and the air and clouds possess potential other than zero, in consequence of the difference electrical forces arise between them which urge the positive electricity from places of low potential to those of higher. The negative electricity, on the other hand, is forced in the opposite direction, making an alternating current. These changes will continue to take place as long as the difference of potential exists.

As an alternating current cannot be stored, it would be useless to try any experiments in this direction, as it is too closely related to perpetual motion, and is moreover a great deal more dangerous. We will make the assertion, however, that if one were able to catch and tame a good sized streak of lightning that it would not produce the energy of an ordinary dry cell.

AMPERE HOUR CAPACITY OF STORAGE CELL.—(901.)

Will you kindly publish in your paper as soon as you can conveniently do so a formula for the calculation of the capacity in "ampere hours" of a storage battery. Kindly give us some data in this relation upon which we can "bank" as being absolutely correct. E. M. S.

There is no formula that will work out on storage batteries in general, owing to the varation in the construction and component parts. In fact, there is no formula that we might be able to give you by means of which you could determine the ampere hour capacity of the various type storage cells turned out by any one manufacturer, as the construction of the different types is entirely dissimilar.

Size of Plates in Inches.	Number of Plates.	Amperes Discharging for Eight Hours.
3 x 3	3	5/8
4¾ x 4	3	1¼
4⅜ x 4	7	3¼
3 x 4	2	¾
5 x 5	2	1½
8¾ x 5	2	3
6 x 6	3	2½
6 x 6	13	15
7¾ x 7¾	5	10
7¾ x 7¾	15	35
11 x 10½	9	40
11 x 10½	27	130
15½ x 15½	11	100
15½ x 15½	75	740
15½ x 31	21	400
15½ x 31	75	1480

Table 901.

The capacity of a storage battery depends upon the amount of active material contained within the plates, and the amount of material exposed, and upon the ease with which one plate can act on another.

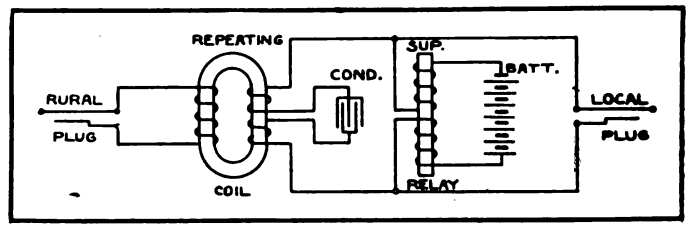

Fig. 902.

Table 901 shows the sizes of and capacity of batteries produced by a well known storage cell manufacturer. By reference to this table you can judge approximately the capacity of your battery. If it is important, however, that you know the exact output of some one particular battery, kindly give us the size and number of plates, together with the name of the manufacturer, and we will be pleased to give you more definite information.

In the table shown, the charging rate is the same as the discharging rate for eight hours, or in other words, it is one-eighth of the capacity of the battery.

CONNECTING MAGNETO AND COMMON BATTERY LINES IN SAME EXCHANGE.—(902.)

Will you kindly describe in detail, at an early date, a method of handling a call between two subscribers, both in the same exchange, one being a magneto line and the other a common battery. The magneto line is a rural party line and the common battery line is a local city line. What we mean by this question is to show a system by which these two different classes of lines may be connected together. Would it be necessary to have a special cord circuit for this on each position of the switchboard in order that the operator might be able to connect all lines with the magneto line? Any information you can give us on this question will be greatly appreciated. C. E. H.

It is common practice to place all the rural lines in one position on the switchboard and thus avoid the confusion attendant upon the placing of different cord circuits in the different positions. By this arrangement the call is brought to the rural operator direct, and she having the combination cords is enabled to make the connection to any local subscriber direct. When a local subscriber calls for a rural line the operator in whose position his signal shows trunks the call to the rural operator, who then makes the required connection and calls the person wanted by ringing the requisite number of signals.

With the very small amount of information given us as to your present equipment, it will be impossible for us to give you a detailed circuit for the purpose you state. In Fig. 902 is shown a simple rural to local cord circuit which may convey to you an idea as to the general plan of this circuit. If you wish a complete circuit worked out for you, we will be pleased to furnish you with one if you will forward to us a diagram of the circuits of your present local equipment.

TEST JOINTS.—(903.)

Kindly explain what test joints on a line are, their value, and how frequently they should be placed on a line of No. 12 copper wire 35 miles long. Does the term "test joint" refer to the openings in a line for testing connected together with test connectors? W. F.

You are correct in your conclusions. A test joint is a joint made with a test connector which allows of opening the line without mechanical injury to the wire. There is no specified distance at which to place them. They are usually placed at convenient points on easy poles to get at and at forks and branches. Some companies place them only where lines enter and leave a town.

We would advise that you place them on each side of a town, at forks and branches, on each side of a strip of timber and at other points where the line is not easy to see.

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WANTED—Position with telephone company as superintendent or manager by married man; 10 years' experience in telephone work. Good on instruments, switchboard and construction. Desires to make change. Good reference. Address Box 865, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 865

WANTED—Permanent position by expert cableman. Expert in splicing and handling cables of all kinds, locating cable trouble with instruments and in cable construction and maintenance. Capable superintendent of construction and maintenance of wire plant or exchange equipment. Good Bell and Independent references. Address Box 893, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 893

WANTED—Wire chief for an exchange of 2,500 subscribers in a Southern city. A good position for man who is competent and willing to work. Address Box 894, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 894

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WANTED---Continued

WANTED—Position by competent telephone engineer; prefer equipment or construction superintendent or like work. Magneto, central-energy, manual, automatic. Technical, practical, energetic. Best of references. Address Box 896, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 896

WANTED—Position as superintendent or foreman of repairs or construction. Twenty-five years' experience with Bell and Independent companies. Best references; good reasons for changing from present position. Address Box 883, care AMERICAN TELEPHONE JOURNAL, New York. 883

WANTED—A salesman, who travels and sells to operating telephone companies, to carry as a side line on a commission basis an article of great merit and with which a good man can do a big business. Address Box 885, care AMERICAN TELEPHONE JOURNAL, New York. 885

WANTED—Position by experienced cable splicer. Permanent position desired. References furnished. Address Box 886, care AMERICAN TELEPHONE JOURNAL, 934 Monadnock Bldg., Chicago. 886

WANTED—Position as manager of large Independent plant by man thoroughly capable of handling financial as well as operating departments; six years' experience and best references. Address Box 887, care of AMERICAN TELEPHONE JOURNAL, New York. 887

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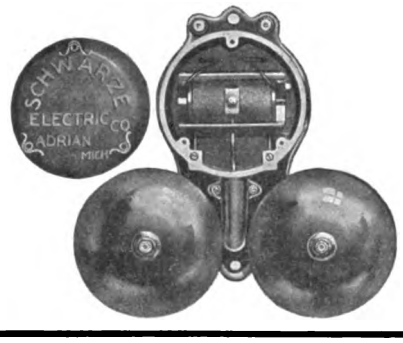

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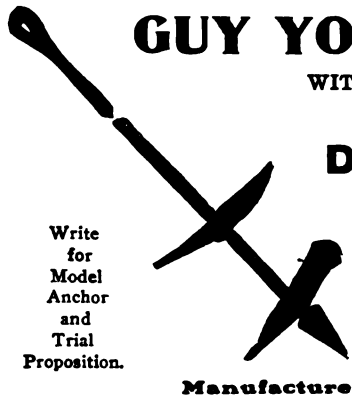

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Patents on Telephonic Inventions

SIGNAL DROP.

H. J. Heeney, Boston, patent 860,132, July 16, 1907; assigned to Hotzer Cabot Electric Company.

The drop which this patent covers is designed with the idea of obviating any possibility of the signal being disturbed and caused to show by vibration or other means than the proper electrical flow of current.

Attached to the armature are two springs of different strengths opposed to each other in such a manner that the stronger of the two holds the armature in an inoperative position while the second assists the magnetic pull to overcome the first spring and allow the signal to be rendered visible to the operator.

TELEPHONE STAND.

L. Steinberger, New York, patent 859,702, July 9, 1907.

This device comprises in conjunction with a desk telephone standard two semi-circular plates adapted to encircle the standard and form a shelf for a memorandum tablet and a place upon which the receiver may be placed when the person talking is obliged to leave the telephone temporarily.

NIGHT SERVICE EXCHANGE ATTACHMENT.

C. E. Ackerman, Vernon Township, Mich., patent 858,775, July 2, 1907.

This patent covers an arrangement of contact springs mounted on a frame, together with a switch blade common to all of the contact springs. The springs are tapped on to one side of each line selected and by the closing of the switch blade all of these lines are connected to ground through an auxiliary telephone at the central exchange building. The object of the arrangement is to provide a means whereby certain subscribers may make calls at night in small exchanges where there is no regular all night service.

COMBINATION SIGNAL AND KEY.

K. M. Turner, New York, patent 861,001, July 23, 1907; assigned to General Acoustic Company, New York.

This device comprises a visual type of signal mounted on the same mounting strip with and above the usual form of switchboard key. The salient feature of the invention is a light pivoted lever which is so arranged as to drop behind the armature of the signal, thus retaining the signal target in the visible position until the key is operated. When this takes place the lever is moved a sufficient distance to allow the restoring of the signal to the inoperative position.

SIMULTANEOUS TELEPHONY AND TELEGRAPHY.

Isidor Kitsee, Philadelphia, Pa., patent 861,125, July 23, 1907.

In a telephone line the secondary of an induction coil is inserted. In series with the primary of this coil is a battery and a telegraph key. Electrical waves induced by sharp impulses of current generated in the primary by the operation of the key are smoothed down and lengthened in the main line through the action of condensers of relatively high capacity which shunt the secondary. The object is to avoid noises in the telephone receiver.

SUBSTATION PROTECTOR.

F. B. Cooke, Chicago, patent 860,016, July 16, 1907.

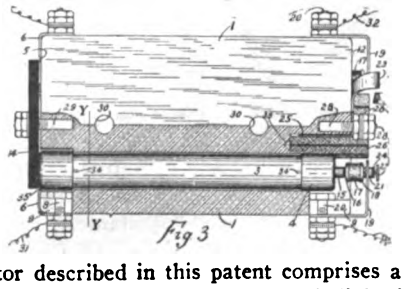

Fig 3

The protector described in this patent comprises a combination of enclosed fuses, thermal protectors and lightning arresters mounted on a solid base of insulating material. The enclosed fuse 3 makes contact with the line at 35 and 4 through the binding posts 8 and 20. Pressing against the ends of the fuse cartridges 3 are heat coils 17, secured in the tension springs 19, so as to open the line circuit in the event of the passage of abnormally high current. The carbon blocks 26, separated by the dielectric 38, constitute a means whereby electrical surges such as lightning may find a path to ground. The entire equipment is mounted on the porcelain base 1.

TELEPHONE SYSTEM.

M. C. Conner, Rochester, N. Y., patent 862,713, Aug. 6, 1907, assigned to C.-C. Tel. Mfg. Co.

In this invention the differentially wound and cut-off relay 14 is connected into the circuit so as to serve as an impedance coil

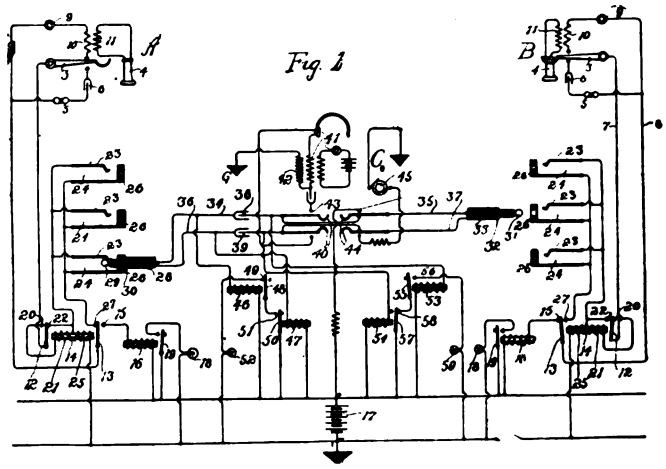

Fig. 1

for the prevention of short-circuiting of telephonic voice currents and to assure an inductively balanced line.

The test rings of the jacks 24 are normally disconnected at contact point 27 from all other parts of the circuit, so as to avoid a click in subscriber's apparatus when the operator in an adjacent section makes a "busy test."

TRANSMITTER ATTACHMENT.

H. Gross, New York, patent 861,459, July 30, 1907.

This patent relates to a mouthpiece attachment, the principal object of which is to provide a means for closing the mouthpiece temporarily during an interview to prevent a person at the other end of the wire from hearing any conversation which may take place during the suspension of the interview.

GUARD ATTACHMENT FOR TELEPHONES.

G. L. Blackburn, Greensboro, N. C., patent 859,479, July 9, 1907, one-half assigned to J. K. Callahan, Greensboro.

This attachment consists of a metal band adapted to be bolted or otherwise fastened to the standard of a desk telephone and to extend below the lower end of the telephone receiver.

Its purpose is to guard against false calls from the raising of the receiver by accident such as resting it on a book or other object on the desk.

TELEPHONE TRANSMITTER.

N. H. Holland and G. W. Kauser, Chicago, patent 858,984, July 2, 1907, assigned to E. H. Stolz, Chicago.

This transmitter is for use in telephone apparatus for the deaf.

The transmitter is provided with a sensitive membrane diaphragm to which is attached a second diaphragm of carbon which is also one of the electrodes.

To secure the required damping effect, the back electrode and carbon chamber is mounted on a pivotal support and pressed in close proximity to the front electrode by means of a coiled spring.

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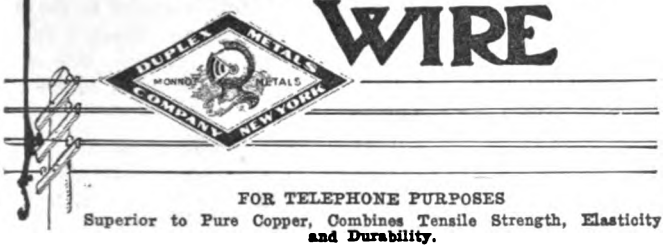

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What the Manufacturers Are Doing

INFORMATION ON CEMENT TESTING.

THE American Conduit Company, 140 Nassau street, New York, in its bulletin No. 221, entitled "Cement Testing for Small Purchasers," calls attention to methods of testing for "soundness" and for "setting." Specifications for medium, ordinary and lean mixtures, serving respectively for work subjected to different amounts and kinds of strain, are given at the foot of the card. It will be sent free of charge to interested persons who ask for it.

MAINE HUB AND MANUFACTURING COMPANY, West Seboois, Me., claims peculiar advantages for its winter cut black birch insulator pins and brackets. The lasting qualities under varying climatic conditions are said to be excellent, and it is reported that they are finding a ready sale from a large number of distributing agencies located in various parts of the country. Any special information desired can be obtained by writing to the manufacturers.

THE F. BISSELL COMPANY, 233 Huron street, Toledo, O., issues a folder describing its "Security" double arming braces. These braces are of bridge construction and are so built that they cannot "give" unless the lags pull out sideways. The company draws attention to the fact that this gives a great deal stronger construction than the use of double wooden arms. It will send full information and particulars covering this material and other Security specialties on receipt of a request.

EQUIPMENT FOR MAGNETO SWITCHBOARDS.

WHEN a toll line passes through an intermediate exchange and it is desired that subscribers whose lines terminate in this office may be able to talk in either direction over a section of the line, a special arrangement of central office circuits is necessary. The principal requirement under these conditions is that when any intermediate station uses a line in one direction the other end of the line shall be left free for signalling or talking. Arrangements to attain this object should be such as to introduce no new conditions liable to give trouble on the circuit or cut down the talking efficiency.

Dean Electric Company, Elyria, O., in its bulletin No. 104 shows the circuit reproduced in Fig. 1, which is used in its magneto switchboards. Each line is provided at the intermediate exchange with three jacks and a single line signal. This signal may be either a bridging drop or a ringer of the type shown in Fig. 2. The intermediate station is called by a code signal, according to a plan similar to those used in ringing bells at subscribers' stations on a regular bridging line.

When an operator at the intermediate station receives a call she plugs into the middle, or bridging jack *B* and determines the direction from which the call originates. She then changes the plug from the jack *B* to the one distinguished by the letter *A* or *C*, as is required, and thus is in a position to complete the call over only the section of the line required for conversation, the balance of the circuit being temporarily disconnected at the contacts of the cut-off jack. At the same time the signal is left on the idle portion of the line to receive an incoming call which may be handled from the jack *A* just as if no part of the line were in use.

The Dean company furnishes individual jacks with platinum pointed contacts for this equipment. When bridging drops are used for line signals jacks are mounted together in a standard combined drop and jack strip, with the drop placed above the middle jack in the set of three. If a loud and distinct signal is required a combined ringer and drop, similar to that shown in Fig. 2, is used and below it on a special mounting strip are placed the three jacks.

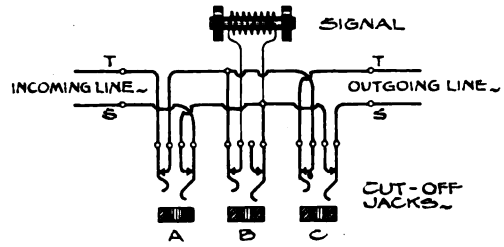

Fig. 1. Illustration of switchboard "cut-in circuit," reproduced from Dean Electric Company's Bulletin No. 104.

The form of signal shown in Fig. 2 is also adapted to use in exchanges where the different subscribers on a party line call each other by means of code signals, and here it gives the operator the means of distinguishing between calls on the line and those intended for the exchange. When the operator is unable to give constant attention to the switchboard the ringing of the bells attracts attention, and as the drop works at the same time, the line on which the call came in is visibly designated, even though the attendant may come to the board a minute or two after the signal was heard. When the shutter is released the falling of the drop shutter closes a contact in a night alarm circuit, which may be used to attract when the operator is very far from the board. Ringers are wound to 1,600 ohms and are especially arranged to work with a very small current.

Provision for four party selective service on magneto switchboards is made by the Dean company through the use of a circuit shown on page 113. Sets of two biased ringers, one arranged to operate on positive and the other on negative pulsating current, are connected to each side of the line. The method of applying proper current from the ringing machine by means of a master key at each position and an individual ringing key for each cord circuit is clearly shown in the drawing. Bridging bells are rung by alternating current without the use of the master key. A special generator, which gives both positive and negative pulsating current as well as alternating, is of course required for use in connection with this circuit. The Dean company states that this system is of high efficiency, but recommends its harmonic selective system for use where a new exchange is to be installed on account of the advantages in operation and maintenance which it claims for the latter. The system employing the biased bells is more especially designed for installation in established plants.

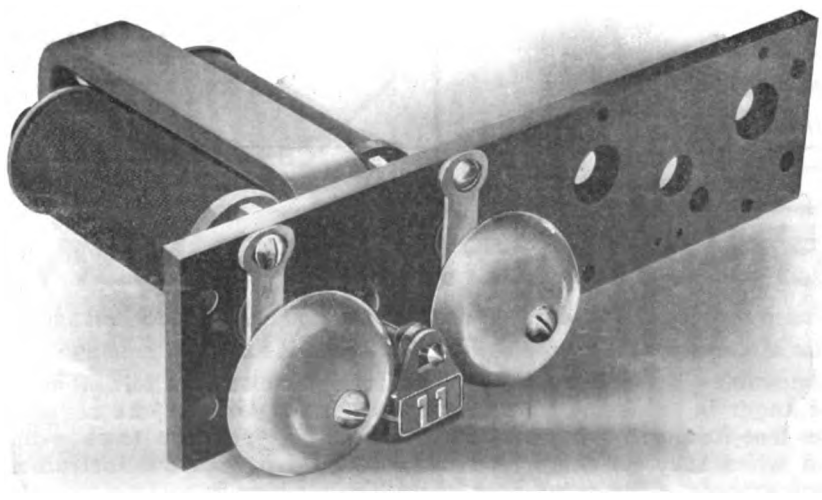

Fig. 2. Dean switchboard ringer signal for rural lines.

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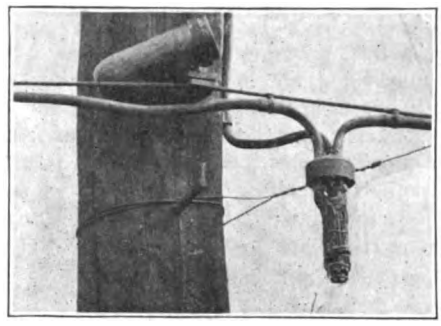

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The expense of a groundman can be eliminated when looking for trouble or making tests when Hargis Joints are used. These are only a few reasons which demonstrate the advantages of the Hargis Cable Splicing Joint.

If you are considering new cable construction or wish to change your Horizontal Wiped Joints to Hargis Joints, on account of their convenience, write us to-day. You will save time and money. You will improve your cable construction.

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What the Manufacturers Are Doing

THE LONG DISTANCE TELEPHONE MANUFACTURING COMPANY, South Bend, Ind., publishes a general catalogue which contains information about a full line of apparatus for telephone companies, including switchboard, power boards and other auxiliary central office apparatus adapted to various typical locations. Full descriptions of subscribers' instruments, transmitters, receivers, extension bells, lightning arresters, etc., are included. Those who are not informed concerning all the apparatus manufactured by this company can obtain this catalogue free of charge by asking for it.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., supplies wool cable for connections between outside cable and main distributing frames. The use of this type of cable eliminates pot heads for this class of work and permits an extremely neat arrangement of wiring at the frame, while all the advantages of protection from moisture are retained. As the wool covering is not inflammable protection against fire is provided. Prices and full information may be obtained by writing to the company.

THE C. H. WORCESTER COMPANY, Tribune Building, Chicago, Ill., issues a telegraph code which covers a system for telegraphing adapted to the requirements of buyers and sellers of white cedar products. The book is not only useful, but very interesting on account of the exceptionally fine illustrations made from photographs taken in the company's yards and lumber tracts.

W. N. MATTHEWS & BRO., 209 North Second street, St. Louis, Mo., have just issued a new double folder that relates to the Callahan cable roller and the Hargis cable splicing joint respectively. This folder not only tells what these specialties are and how they are used but states reasons in support of the company's claims that they are decidedly in the money saving order of specialties.

THE VOTE-BERGER COMPANY, manufacturers of telephones, switchboards and appliances at La Crosse, Wis., reports that it has recently closed a contract with the Wood County Telephone Company, Grand Rapids, Wis., for a complete common battery ballast multiple equipment for the exchange at Grand Rapids. The board is to have an ultimate capacity of 2,000 lines, with 500 lines installed, arranged for four party selective ringing.

The company also reports the sale of a common battery ballast switchboard to the Viroqua Telephone Company of Viroqua, Wis., with a capacity of 400 lines, non-multiple, with 300 lines installed and a 300-line ballast board, with 200 lines installed, to the Union Telephone Company, Prairie du Chien, Wis. All three of these boards are to replace magneto equipment, which has proved inadequate for the service.

The feature of the ballast switchboard which is mainly responsible for the securing of these orders and which appeals to all telephone men, is the simplicity of its circuits. This end is brought about by the elimination of all relays in the board, and as a result the greatest source of trouble found in common battery boards is done away with. Consequently the maintenance expense of the ballast board is said to be below that of the relay type of common battery equipment. In the whole ballast system there are practically no moving parts that can cause maintenance expense except the cords. The result which the company claims to be able to show is a decided saving in the salaries of trouble men, etc., which is sufficient to amount to a considerable item at the end of a year.

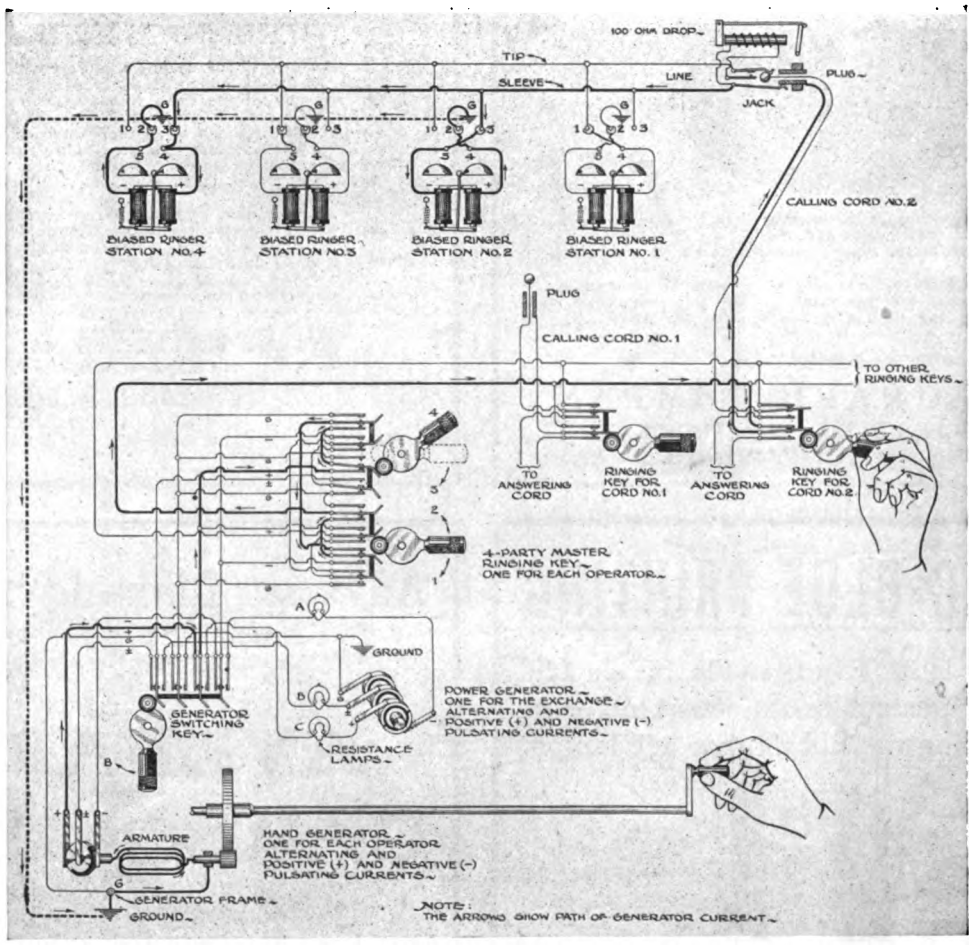

Fig. 3. Dean central office and line circuit wiring for positive and negative pulsating current divided circuit system. This equipment gives forty-party selective ringing.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Conn., is sending out a folder which bears striking testimony to the growth which comes to a business based upon a meritorious product. Pictures of the first Trumbull factory, erected in 1901, and of the present large plant for the manufacture of knife switches are shown. The company simply invites attention to the two pictures and allows the observer to draw his own conclusions.

MATHIAS KLEIN & SONS, of Chicago, Ill., in their catalogue of tools cover about everything which is needed by either an inside or outside workman in connection with a job on a telephone plant. Illustrations of all the tools and appliances are shown and prices given. The company will be pleased to forward copies of this book to interested persons.

HARVARD ELECTRIC COMPANY, 66 West Van Buren street, Chicago, Ill., publishes a catalogue covering protectors and specialties particularly used on rural lines and in small exchanges.

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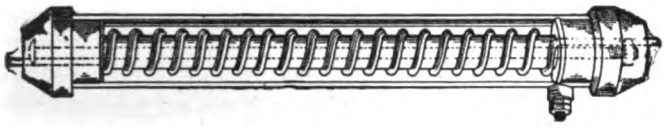
SKY ROCKET ARRESTERS



In the Sky Rocket Arrester a 50-inch length of wire is built up into a succession of coils around a porcelain tube having a choking or reactance effect, and is surrounded by an iron cylinder to which is attached the ground wire.

When current of excessive potential, such as lightning, strikes the line wire it will not travel over this succession of coils into the telephone or switchboard. Instead it chooses the shorter path to ground, which is obtained by leaping the minute air gap between the discharge points of the wire helix and the grounded iron cylinder.

¶ Always protect. The final criterion of success of an arrester is infallible protection under every condition of service.

¶ Sky Rocket Arresters do protect, as is clearly shown when the many points of discharge are considered.

¶ An engineer of high standing says:

¶ "The multigap arrester has been used for years....its excellent qualities for discharging transitory lightning are well known." The Sky Rocket is infallible.

¶ Get a sample. Write to-day.

Chance Manufacturing Co.
Centralia Missouri

Easophones
The WIRE & TELEPHONE COMPANY of AMERICA ROME, N.Y.

The Easophone Girl Smiles

No, you need not apologize for keeping me at the 'phone. I am not standing; on the contrary, am quite comfortable in an arm chair, and the instrument is so light, is always near by, and so little effort is required in talking that I say nice things now when the bell rings.

Next week this girl does not smile

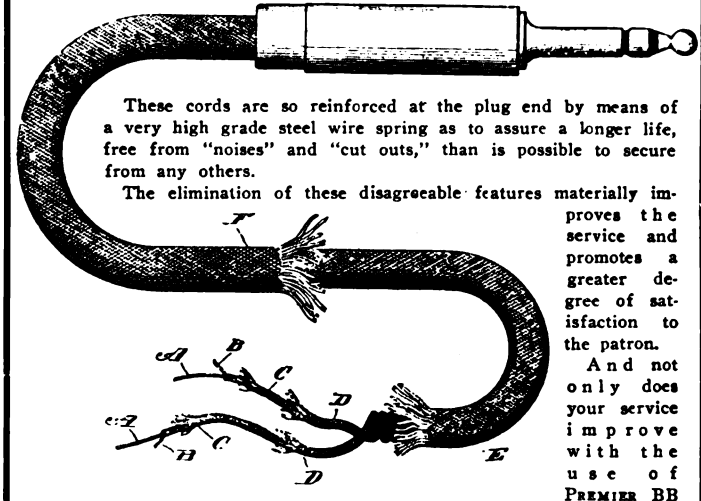
The switch hook box and instrument is so small and attractive and is so necessary that I have one in each of the bedrooms, as well as in the den, library and other living rooms.

See adv. of Aug. 10th and Aug. 24th, and write for Bulletins Nos. 101 and 102.

THE WIRE & TELEPHONE CO. OF AMERICA, Rome, N. Y.

Premier BB Steel Cords

For Increasing Efficiency of Service and Lowering Operating Maintenance Costs



These cords are so reinforced at the plug end by means of a very high grade steel wire spring as to assure a longer life, free from "noises" and "cut outs," than is possible to secure from any others.

The elimination of these disagreeable features materially improves the service and promotes a greater degree of satisfaction to the patron.

And not only does your service improve with the use of PREMIER BB CORDS, but the large expense due to constant changing and repairing of cords is entirely absent.

We have recently revised our cost records and have established new prices which, like PREMIER BB CORDS, are to your advantage.

Ask us for them to-day

Runzel-Lenz Electric Mfg. Co.
97-101 South Clinton St., Chicago, Ill.

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Non-Technical News Items

NEW COMPANIES.

BENTON, ARK.—The Benton Telephone Company has been incorporated with a capital stock of $3,000, and the following officers elected: President, J. M. Caldwell; vice president and general manager, W. L. Lee. These, with W. L. Caldwell and J. F. Lee, are the incorporators.

DECATUR, ILL.—The Decatur Home Telephone Company, which is to be operated in Decatur, Ill., and which is backed by Illinois capital, has been incorporated at Jersey City, N. J., with a capital stock of $300,000.

NEOLA, IA.—An Independent telephone company, which is to have a capital stock of $25,000, is being organized by the citizens of this city. Among those interested in the new enterprise are Dr. J. H. Lowrey, Frank B. Downs, T. J. Ensign and Riley Clark, of Neola.

CORYDON, KY.—Owing to an increase in rates by the Cumberland (Bell) Telephone & Telegraph Company, the citizens of this city and Henderson have decided to organize an Independent telephone company.

RAYVILLE, LA.—An Independent telephone company, in which the prime mover is Brown M. Dorrity, is being organized at Rayville. It is the new company's intention to build lines from this city to Mangham and the Gold Mine Plantation and thence to Winnsboro and further South. Application has been made for a franchise and liberal subscriptions toward the support of the company are being received from the citizens of Richland and Franklin parishes.

BUTTERFIELD, MINN.—An Independent telephone company is being organized at Butterfield. It is expected to have articles of incorporation filed at an early date.

CLIO, N. C.—The Clio Telephone Company, of Clio, Iredell county, has been organized to purchase, improve and extend the Clio telephone system. It has an authorized capital stock of $7,000 and $350 has already been subscribed. Among those who are interested in this company are H. S. King, E. S. Millsapps, S. C. Johnson, J. K. Patterson, J. O. Gaither, Dr. J. V. Williams, J. W. Redman, S. Gross, G. G. Martin and W. W. Holland.

DEMOCRAT, N. C.—A new telephone company, to be known as the North Buncumbe Telephone Company, has been organized at Democrat, N. C. The capital stock is given at $5,000 and James N. Morgan and others are stockholders.

MANDAN, N. D.—Supported by local capitalists, an Independent telephone company is being formed in this city. The capital stock is to be $25,000, of which $15,000 has already been subscribed, and an application for a franchise is to be made to the city council.

MEKINOCK, N. D.—The Turtle Co-operative Telephone Company is the name of a new Independent telephone company recently organized at this city. The company is capitalized at $50,000 and a large amount of the stock has already been subscribed for by the farmers residing in this district. The company will build a rural telephone system and operations are to commence at an early date.

GUTHRIE, OKLA.—A new farmers' Independent telephone company has been organized to operate in Cedar township, west of Guthrie. Already a number of telephones have been rented and installed. The line is seventeen miles long and will soon be connected with the local exchanges.

WARREN, OKLA.—Articles of incorporation have been filed by the Warren Central Telephone Company. It has an authorized capital stock of $2,000 and the incorporators are T. S. Woody, A. F. Hendricks, J. T. Baird and S. A. Biddy.

MEDFORD, ORE.—The Medford-Blue Ledge Telephone and Telegraph Company has been organized at Medford and the following officers elected: President, F. C. Page; vice-president, Charles Strange; treasurer, W. I. Vawter; secretary, Holbrook Withington; general manager, Walter H. Parsons; directors, F. C. Page, Charles Strange, W. H. Parsons, A. E. Reames and H. Nicholson. Lines are to be erected from Medford to the Blue Ledge, with a branch to the Sterling Mine.

LORD'S VALLEY, PA.—Articles of incorporation have been filed by the Lord's Valley Telephone Company of Lord's Valley, Pike county. It has a capital stock of $5,000.

KENNEBEC, S. D.—An Independent telephone company is being organized at this city which expects to install a local exchange and construct rural lines. Among those interested in the enterprise are Jene Brown and Byron Reid.

WALLIS STATION, TEXAS.—The Wallis Telephone Company has been organized with a capital of $2,500, and the following officers named: E. F. Louwien, manager; W. L. Guyler, secretary and treasurer; F. D. Brandt and Frank Pazderny, trustees. It is a co-operative company and proposes to install a local exchange here and then extend it out into the surrounding country to all the farm houses. The stock, which is issued in shares of $10 each, is held by the business men and farmers of this community.

BERKLEY, VA.—A new telephone company, to be known as the People's Telephone Company, has been organized and expects to erect lines connecting Berkley with Providence Church, Great Bridge, Centreville, Hickory Ground, St. Bride's and other points on the Norfolk & Southern Railroad. The following officers have been elected: J. G. Baum, president; V. Engell, secretary; C. M. Williamson, treasurer.

DALLAS, WIS.—A farmers' telephone company has been organized and lines are being extended in all directions. One hundred telephones have been rented.

DURAND, WIS.—The Inter-County Telephone Company with a capital of $8,000 has been incorporated, and the following are among the incorporators: W. H. Gifford, Ward. E. Loodell, Phil Fox, N. P. Ward, Ed. Will and Charles Winget.

CHILLIWACK, B. C., CANADA.—The Chilliwack Telephone Company has been incorporated with a capitalization of $20,000, in 2,000 shares of $10 each, to establish a general telephone service at Chilliwack.

BLENHEIM, ONT., CAN.—The Blenheim and South Kent Telephone Company, Ltd., of Blenheim, has been incorporated with a capital stock of $10,000 and the following directors elected: Geo. Taylor, Jas. Rutherford, Harry Drane, Andrew Denholm, Charles H. Echlin, of Blenheim, and others.

BETHEL, ONT., CAN.—Articles of incorporation have been filed by the People's Mutual Telephone Company, Ltd., of Bethel. The capital stock is given at $21,000 and the following directors have been named: Thomas Alexander Crawford, William Henry Sine, Arthur Franklin Rightmeyer, William Henry Allison and Albert Stanley Brown, all of the township of Sophiasburg.

FRANCHISES.

WEISER, IDAHO.—The petition of J. S. Wallace and six others asking for a right of way for a public telephone line along the highways in road districts Nos. 1 and 5, has been granted to B. Dick Hartley.

JEFFERSONVILLE, KY.—J. W. Fortune, who is looking after the interests of the Home Telephone Company at this city, expects soon to apply to the City Council for a franchise.

JERSEY CITY, N. J.—At a recent meeting the Merchants' Protective Association decided to request the Street and Water Board to grant the franchise applied for by Coast Line Telephone Company.

MT. VERNON, N. Y.—The State Line Telephone Company, which is seeking a franchise in this city, it is expected, will be given a hearing at the next meeting of the Common Council.

WINSTON-SALEM, N. C.—The North State Telephone Company, represented by S. L. Blackburn, has applied for a franchise to connect High Point and numerous other towns with Winston-Salem. If the franchise is granted about two thousand telephones will be installed in Winston-Salem.

GEORGETOWN, S. C.—A franchise has been granted to the Home Telephone Company authorizing it to construct, operate and maintain a telephone system in this city.

LURAY, VA.—The town council of Luray, which has been advertising a telephone franchise for sale, has disposed of it to the Page Valley Telephone Company.

FINANCIAL.

LOS ANGELES, CAL.—The Home Telephone and Telegraph Company, of Los Angeles, has declared its regular quarterly dividend of 1¼ per cent. per share on its preferred stock, payable August 10.

LOS ANGELES, CAL.—The Union Home Telephone and Telegraph Company has paid interest on its bonds, amounting to $25,000.

KANKAKEE, ILL.—At a recent meeting of the directors of the Independent Telephone Company a semi-annual interest at 2½ per cent. on the bonds was ordered paid.

MT. PULASKI, ILL.—The capital stock of the newly organized Mt. Pulaski Independent Telephone Company has been increased to $8,000.

DES MOINES, IA.—The capital stock of the Mutual Telephone Company has been increased from $450,000 to $1,600,000, of which $1,000,000 is common stock and $600,000 preferred.

NEWTON, IOWA.—At the annual meeting of the stockholders of the Jasper County Telephone Company, held at Newton, it was decided to increase the capital stock to $150,000 in fifteen hundred shares, at par value of $100 each. Of this capital stock four hundred and fifty shares are to be issued as preferred, paying a guaranteed dividend of 8 per cent. per annum, payable semi-annually.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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National Pole Company

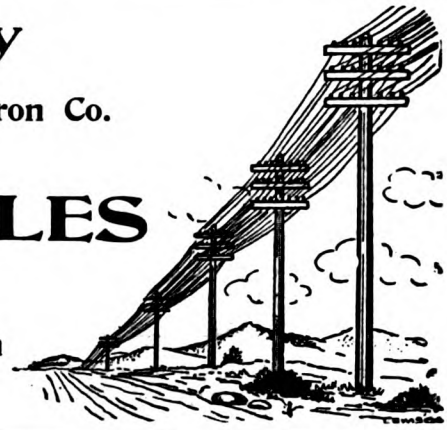
SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from
Maine to Washington



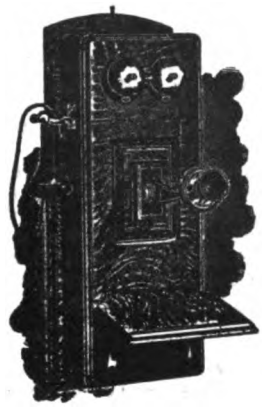
CROSS ARMS

LONG LEAF YELLOW PINE

All Heart, Special Sizes, Plain Painted or Creosoted. Large Stocks, Quick Shipments.

LEWIS LUMBER & MFG. CO.,

Hattiesburg, Miss.



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1st TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.

Harrison and Clinton Sts., Chicago

YARDS:
ESCANABA
WILSON
DAGGETT
REED CITY

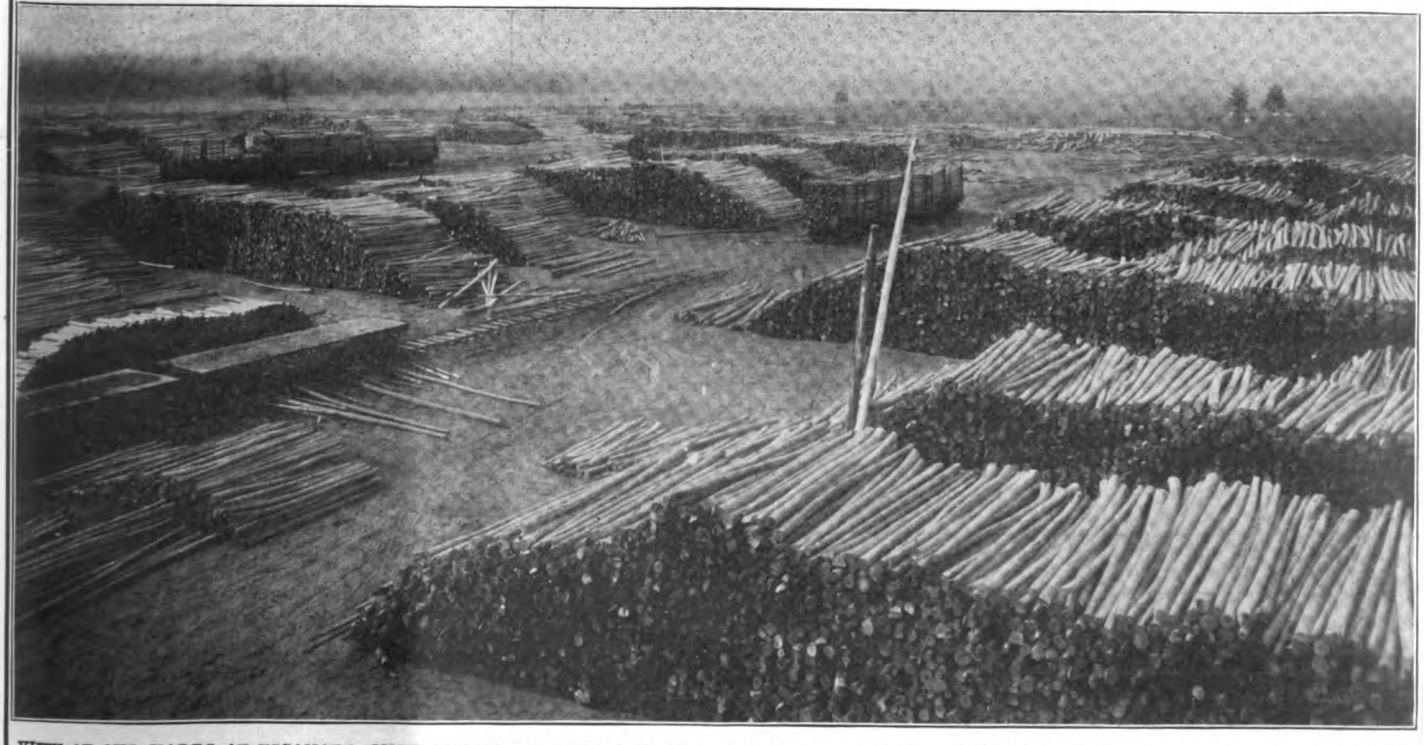
Kellogg Switch-Board & Supply Co.

CHICAGO, ILL.

WHITE CEDAR POLES

DOESN'T THIS LOOK LIKE PROMPT SHIPMENTS FROM STOCK?

BRANCH OFFICES:
PHILADELPHIA
CLEVELAND
KANSAS CITY
LOS ANGELES
ATLANTA
WINNIPEG



VIEW OF OUR YARDS AT ESCANABA, MICH, TAKEN JULY 1ST, 1907—To keep our loading gangs busy during the dull summer months we are naming very attractive prices. Write us for delivered prices. We also handle chestnut and western red cedar.

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Non-Technical News Items

JOPLIN, MO.—At a meeting of the directors of the Home Telephone Company the first quarterly dividend of 1½ per cent. was declared. The company intends in the future to declare quarterly dividends instead of annual dividends.

HORNBY, N. Y.—The capital stock of the Hornby Telephone Association has been increased from $2,000 to $4,000.

RALSTON, PA.—A 5 per cent. dividend has been declared by the Ralston Telephone Company and the company has decided to set aside a 2 per cent. reserve.

SALT LAKE CITY, UTAH.—The capital stock of the Utah Independent Telephone Company has been increased from $1,000,000 to $1,300,000.

ELECTIONS.

AVON, ILL.—At the annual meeting of the Avon Mutual Telephone Company the following officers and directors were elected: Dr. S. S. Clayberg, president; Oliver Crissey, vice-president; Lester Ross, secretary; A. Sundberg, treasurer. Directors: George W. Shinkel, Lester Ross and L. R. Lockwood. These directors are to serve for a term of three years.

HIGHLAND, ILL.—The new officers of the Highland Farmers' and Merchants' Telephone Company are A. P. Mosimann, president; Henry Buchheim, vice-president; C. T. Pabst, secretary and treasurer. The remaining shareholders form the board of directors.

YANKTON, S. D.—The Yankton Independent Telephone Company has elected the following officers: Fred Schrauber, president; R. H. Jones, vice-president; F. L. Van Tassel, secretary; W. H. Edmunds, treasurer. The officers and M. P. Ohlman, C. J. Navotny and C. H. Dillon compose the directorate.

GRAFTON, W. VA.—At a meeting of the newly organized Pruntytown Telephone Company the following officers were elected: President, W. E. Carter; secretary, C. T. Reynolds; treasurer, C. B. Kinsey.

CLEAR LAKE, WIS.—The newly elected officers and directors of the Clear Lake Telephone Company are: George F. Griffin, president; F. A. Partlow, vice-president; J. C. Saxton, secretary and A. A. Holliday, treasurer. Directors: J. C. Saxton, A. A. Holliday, George F. Griffin, F. A. Partlow and C. W. Ward.

COMBINATIONS.

GARDEN CITY, KAS.—The Garden City Telephone, Light and Manufacturing Company, formerly owned by W. H. Spurgeon, C. W. Kurie and Charles E. Turner, has become the property of F. R. Marsh, of Colorado Springs, Col., the purchase price being $55,000. Many improvements in the telephone plant are planned by the new owner.

ELIZABETHTOWN, KY.—Connections are to be established between the Home Telephone Company, of this city, and the Leitchfield Telephone Company, of Leitchfield. The distance is thirty-one miles and the construction work is to be divided between the two companies.

PLATTEVILLE, WIS.—The Farmers' Telephone Company has acquired the Bloomington, Potosi, Platteville and Dodgeville lines of the Union Telephone Company.

MISCELLANEOUS.

HIGHLAND, ILL.—The system of the Highland Farmers' & Merchants' Telephone Company, formerly owned by James S. Cumming, of St. Louis has been sold to A. P. Mosimann, C. T. Pabst, M. Matter, J. N. Stokes, L. O. Kuhnen, Henry Buchheim, of Highland, and Phil. Baer, of St. Jacob, the consideration being $15,000, divided into six hundred shares at $25 each.

OAKLAND, ILL.—The Embarrass Telephone and Telegraph Company has changed hands and is now owned and controlled by Milton Collier, of Dana, Indiana.

CRYSTAL LAKE, IOWA.—Several telephones of the North Crystal Rural Telephone Company were badly damaged during a recent storm.

YOUNGSTOWN, O.—The passage of an ordinance for a municipal telephone exchange for the fire and police departments of the city of Youngstown has been recommended.

PARIS, TEX.—The Southwestern Tel. & Tel. Co. (Bell) has raised the residence rate at Paris and its patrons are up in arms. The Citizens' Telephone Co. is swamped with orders in consequence; it has just installed 40 new instruments with 62 more orders to fill and a prospect of at least 200 additional by September first.

PERSONAL.

CHARLES A. CARL has been appointed manager of District No. 3 of the American Union Telephone Company. This district includes the divisions of Harrisburg, Carlisle, Chambersburg, Gettysburg and Hanover. The principal towns in the district having exchanges connected with one or more of the divisions are Steelton, Elizabethville, Mechanicsburg, Camp Hill, Dauphin, Gratz, Halifax, Hershey, Hummelstown, New Cumberland, Oberlin, Shiremanstown, West Fairview, Wisonisco, Williamstown, Tower City, Middletown and Newville.

With the Builders

PASADENA, CAL.—Extensive improvements in its plant at Pasadena are to be made by the Home Telephone Company, of Los Angeles, and a line from Rivera to Santa Fe Springs is also to be constructed.

AVON, ILLS.—At the annual meeting of the Avon Mutual Telephone Company it was decided to commence soon the repairs upon its system. The switchboard will be given a thorough overhauling, many lines rebuilt and quite a few additional cables installed.

SAN JOSE, ILL.—The Forest City Telephone Company is rebuilding its plant and has installed a new switchboard.

TULSA, I. T.—The Texas Company, which is building a pipe line from Tulsa, I. T., to the Gulf of Mexico, contemplates the installation of a telephone system along this route.

DECORAH, IA.—The lines of the Standard Telephone Company between Decorah and Mabel are being rebuilt.

JEFFERSON, IOWA.—The Greene County Telephone Company, owing to its greatly increased business, will soon install its new switchboard. The new outfit is expected within a few days and will be put in place just as soon as possible.

LE SUEUR, MINN.—The Farmers' & Merchants' Mutual Telephone Company is building a new line east of this city, which will give subscribers on that line direct connection with Le Sueur instead of through Center, as heretofore.

ANACONDA, MONTANA.—Plans are being prepared for the installation of the system of the Independent Telephone Company, which will commence at an early date. Manager Mott expects to have the system in operation within three months.

BILLINGS, MONT.—An exchange building is being erected in this city for the Mutual Telephone Company, in which it expects to install its new system.

WYMORE, NEB.—Extensions in its system are being made by the New Home Telephone Company at this city.

ALAMOGORDO, NEW MEX.—The Alamo Telephone Company has greatly extended its toll line system by placing telephones at the reservoirs, at the head works in upper Alamo canyon and at the Ward ranch, near the summit of the Sacramento. This line will eventually be extended to reach the lumber camp and on to Weed, thus bringing Alamogordo in touch with a new territory.

SILVER CITY, NEW MEXICO.—The recently organized Silver City, El Paso and Southwest Telephone Company is at work constructing its long distance telephone line between Silver City and Deming which, when completed, will give Silver City telephone connection with every important point in the Southwest. The organizers of the new company include Clyde Smith, W. D. Murray, C. B. Bosworth, J. H. Morgan, W. E. Baker and Wm. Palmer.

AMARILLO, TEXAS.—The H. H. Davenport Telephone Company, which has recently obtained a franchise in this city, is about to begin the construction of its exchange building.

PARIS, TEXAS.—It is the intention of the Citizens' Telephone Company to make many improvements in its system and to establish long distance connections with Dallas, Fort Worth, Wolfe City, Commerce and Hugo, I. T.

HUNTINGTON, W. VA.—The Mutual Telephone Company is considering the advisability of establishing connections with the rural lines at Ona.

LANCASTER, WIS.—The lines of the Farmers' Telephone Company are being extended.

WINNIPEG, MAN., CAN.—Plans are being prepared for the erection of a new telephone exchange by the Government Telephone, Telegraph and Railway Department. It is estimated that the cost will be about $100,000.

MARKHAM, ONT., CAN.—Further extensions in its system are contemplated by the Markham and Pickering Independent Telephone Company.

UNDERGROUND.

PENSACOLA, FLORIDA.—Complying with orders from the city, the Southern Bell Telephone and Telegraph Company has begun the laying of its conduit system.

PONTIAC, ILL.—The wires of the Livingston County Home Telephone Company are to be placed in conduits at Pontiac.

ANACONDA, MONTANA.—The Independent Telephone Company is rapidly constructing its underground system.

DOVER, N. H.—The conduit system of the New England Telephone and Telegraph Company is being extended in this city.

ELMIRA, N. Y.—The Mayor and Board of Public Works are considering the advisability of compelling telephone and telegraph companies to place their wires in conduits.

APPLETON, WIS.—The resolution ordering all telephone wires underground, which was being considered by the Appleton Council, has been passed.

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The American Telephone Journal

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VOLUME XVI. SATURDAY, AUGUST 24, 1907. NUMBER 8.

Notes on Telephone Development and Service in Japan

Article II—Observations of Construction Details

By G. C. Hodge.

In Yokohama the first thing that strikes the eye of a telephone man as he is trundled from the wharf toward his hotel in a jinrikisha is a long row of telephone poles, all fitted with heavy wooden "push and pull" braces. These extend right over the footpath, almost to the lot line. This type of construction on a straight pole line in a large city presents a very remarkable appearance to an American. The illustration on this page shows it clearly. This idea of heavily bracing lines seems to be very generally adopted by the Japanese telephone engineers. An attempt was made to ascertain the reason for using so many of these braces, but the writer's limited knowledge of the Japanese language, and the inability of his guides to speak English made it very difficult to find this out. From the statements made by the Japanese it would appear that the poles were made heavy and firmly secured to enable them to withstand the force of the typhoons, the wind storms which sometimes sweep over the country with great violence. Not only are the braces used in urban construction, but toll lines are side guyed both ways, and head guys are used every half mile, providing fully against all extraordinary stresses.

A Typical Example of Telephone Construction Work in Japan.

All the poles used for supporting wires are of a species of cedar very similar to the cedar of this country. They are impregnated with copper sulphate at the works which are maintained near the timber limits for their treatment. It appears that the necessity for preserving the wood is recognized just as fully abroad as it is in our own country.

The crossarms used are in many instances made of iron, formed in the shape of an inverted L. These present a very neat appearance on a pole, and also have the advantage that only a small gain need be cut to hold them. Porcelain insulators seem to be used on all lines, following the common practice of Europe. They are mounted on iron pins, which are bolted to the crossarms. Tops of poles are cut off to give a flat horizontal surface, and are then fitted with a tin roof. At several corners structural steel poles, built in latticed form, are used. City lines are all built of No. 16 B. & S. copper, and the trunk lines of No. 8 copper.

As one travels through the country on the train many important trunk lines are seen, and their substantial construction is very noticeable. It would be hard for the most exacting superintendent of construction to find any cause for complaint. Aside from the general appearance of firmness, the most interesting detail is that every pole is provided with a guy of some kind. If some of the American guy anchor manufacturers could get a contract to supply the Japanese government with anchors (which apparently are not used at all at the present time), they would probably have enough work to keep their factories going for some time on orders from this source alone. The guy wire used is all No. 9 iron wire, several strands being twisted up by hand to form a guy. Here, again, there seems to be an opportunity for some enterprising manufacturer to convince them of the advantages of using his product. The general plan of the administration seems to be to provide fixtures of the most durable nature in order to insure the service against all interruptions which can be foreseen. Although the heavy guying seems at first sight to be somewhat extravagant, there is little doubt that a close examination of maintenance accounts, with due consideration given to the possible effects of a storm on less substantial lines, would fully justify the far-sighted policy which is so clearly evident. As it is, there is little danger of such an occurrence as the prostration of a long stretch of poles on an important line, as sometimes occurs during a severe storm in places where a smaller factor of safety is used on cross-country toll lines. These Japanese lines produce a very favorable impression upon the visitor, and he is likely to carry away the idea that they are built by thoroughly competent men.

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Talking and Telegraphing Simultaneously Over the Same Line

Article III—The Composite Ringer

By N. C. Kissell.

SPECIAL apparatus and circuits are necessary for signalling between telephone stations on a composite line without interfering with the "Morse" instruments. The device for accomplishing this, which is ordinarily used, comprises several instruments wired together to form what is collectively designated by the name "composite ringer." This provides for sending out on the line signalling current of too high a frequency to operate telegraph relays, and for the operation of a signal by this current when the apparatus is at the "incoming" end of a toll line. Composite circuits are not wired permanently into a toll line, but are arranged so that they can be placed in any line, so that in case the line upon which they are being operated becomes in trouble they can be shifted to a line in good working condition. It is therefore necessary to so wire them that the operator at the telephone switchboard may ring on all the lines in the same manner, whether they are composited or not. As the generator ordinarily used to ring on telephone lines gives out current at a comparatively low frequency, the action of the composite ringer will be to replace this low frequency ringing current with one of high frequency which will not interfere with the telegraph instruments. The action of the composite circuit (Fig. 1) is worth studying step by step for outgoing and incoming signals. When the operator rings from the switchboard end of the circuit, the low frequency ringing current passes over wire 1, through contacts on relay *B*, wire 2, through condenser 3, relay *D*, wire 4, contacts on relay *B* and back to generator.

The relay *D* is designed to operate on low frequency alternating currents. The arrangement of its essential parts is shown in detail in Fig. 2.

The armature *a* is a piece of soft iron sufficiently massive to possess considerable mechanical inertia. A light flexible spring, *e*, is attached to the armature as shown, and makes contact with the stud *f* when the armature is drawn up. As this spring extends above the armature, and is very flexible, it will make contact with the stud *f* before the armature is fully drawn up; also it will not break contact until the armature has dropped a considerable distance. This construction will allow the armature to flutter in a given range without breaking contact between *e* and *f*. When an alternating current is passed through the coil the armature is drawn up, making contact with *f* before its movement stops. The ringing current being of low frequency, the armature is fully drawn up, however, before the current ceases and starts to flow in the opposite direction. The instant current ceases the armature starts to drop down, but is so massive that a fraction of time elapses before it starts to drop. It only drops a little before current is back in the coil again, remagnetizing the core in the opposite direction and causing it to again exert a pull on the armature. This will cause the armature to flutter in a certain range, but the contacts do not make and break owing to the flexibility of the spring contact *e*.

When the armature is at rest its weight closes the contacts *g* and *h*, and when it is drawn up these open by means of the resiliency of spring *g*. When the operator rings through relay *D* the latter therefore opens one circuit and closes another at the same time. It opens the circuit through relay *F*, and closes one starting from 24 volt battery, relay *E*, wire 5, relay *C*, wire 6, relay contact on *D*, to ground, through which it flows back to battery. This energizes relays *E* and *C*, causing them to draw up their armatures. When the contacts on relay *E* are closed alternating current from the generator at a given instant passes

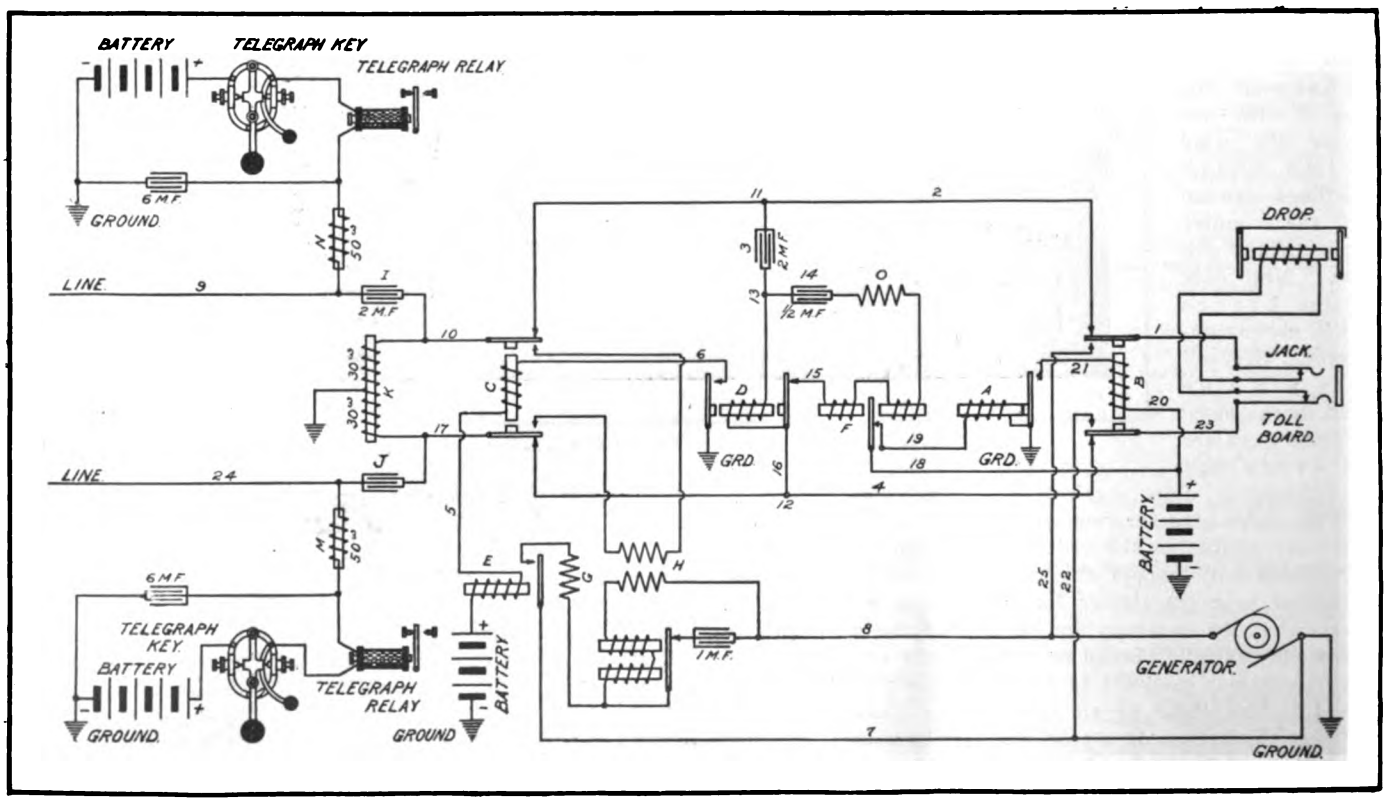

Fig. 1.—Circuit of composite ringer, which makes it possible to signal between telephone exchanges without affecting telegraph instruments on a composited toll line. All apparatus required for telephone and telegraph work at one end of a line is shown in this circuit.

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over wire 7, relay contacts, through a non-inductive resistance *G*, then through the coils of the interrupter, primary of a small transformer *H* back to generator over wire 8. This causes the armature of the interrupter to make and break contact, thereby inducing in the secondary of the transformer *H* a high frequency current which passes to the composite circuit through contacts on relay *C*. This current, being of very high frequency, will pass through condensers *I* and *J*, and out over the line, being prevented from short circuiting itself by the high impedance of coil *K*, and also from passing back through the "Morse" instruments and ground by the coils *M* and *N*. If any of this current should pass through the coils *M* and *N* into the "Morse" relays, it would be so small and alternate so rapidly that it would not affect their armatures on account of their mechanical inertia and the inertia of the spring attached to them. To summarize this whole action, when the operator rings on the circuit the low frequency current from the exchange generator is replaced by one of high frequency which passes over the line.

Coming in over the line wires, the high frequency signalling current encounters the high impedance of coils *M-K-N*, and so keeps the direct path, passing through condensers *I* and *J* into the composite ringer. At the incoming end this current comes in over line wire 9, through condenser *I*, wire 10, and through contacts on relay *C* to point 11. Here it has two paths offered to it, one of which leads to the toll board through the drop and back to point 12. Whatever current passes through the drop will be so small, however, and will alternate so rapidly, that it will not affect the drop. From point 11 the current passes through condenser 3 to point 13, where two paths are again offered. One is through relay *D* and the other through relay *F*.

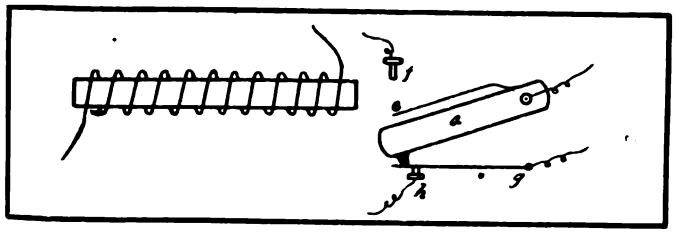

Fig. 2.—Skeleton diagram of alternating current relay, operated by current from ordinary ringing generator, used in composite ringer circuit.

The small amount of current which passes through *D* will not affect its armature, on account of the inertia of the heavy piece of iron. From point 13, then, the high frequency current which must be considered will pass through condenser 14, resistance *O*, through the high frequency relay *F*, wire 15, contacts on relay *D*, wire 16, contacts on relay *C*, wire 17, condenser *J* to the other line wire 24 and back to the distant station. This current, passing through relay *F*, will set the latter in rapid vibration. The construction of this relay is shown in detail in Fig. 3, substantially correct, but with slight changes to give a clear idea of its operation. A piece of steel which is permanently magnetized, having both north and south poles, is shown at *a*. To one end of this is screwed a soft iron core wound with insulated wire. To the other end is rigidly fastened one end of a rather heavy reed of steel, *b*, the opposite end of which is in front of the soft iron core. In conjunction with this heavy reed is another lighter reed, fastened rigidly at one end, and insulated from the reed *b*. One end of this rests against the heavy reed near its top, and makes electrical connection with it. When an alternating current of high frequency is passed through the coil the reed *b* will be set into vibration, and in turn will cause the light reed, *c*, to vibrate violently, thereby making and breaking contact with reed *b*. Referring to Fig. 1, a circuit is normally made, starting from 24 volt battery and passing through wire 18, the reed contacts on relay *F*, wire 19, through relay *A* to ground and back to battery. This current causes the armature on relay *A* to be held up all the time normally; but, when the reeds on relay *F* are set into vibration, the making and breaking of the circuit causes the relay *A* to release its armature, thereby completing a circuit starting from 24 volt battery, wire 20, relay *B*, wire 21, relay contacts on *A* to ground back to battery. This causes the armatures on relay *B* to draw up, making a circuit from exchange generator through wire 22, contacts on relay *B*, wire 23, into the toll board, returning over wire contacts on relay *B* and wire 25 back to the generator. This rings down the drop. To summarize, then, the action of a pair of composite ringers is to substitute for the low

Fig. 3.—Simplified diagram showing type of high frequency alternating relay used in composite ringer circuit.

frequency current from the board a high frequency current which passes over the line, and the high frequency currents from the line, and at the incoming end, cause a low frequency current to pass to the toll board. This circuit is used commercially every day and is very successful, giving so little trouble that it may be properly said to work perfectly.

THE OPEN-TANK METHOD FOR THE TREATMENT OF TIMBER.

A MARKED saving in three directions—cost of equipment, of materials and labor and of transportation—is being effected by the introduction of what is known as the "open-tank" method of treating timber. The general practice of preserving timber has hitherto been retarded by the heavy cost of closed retorts and other complicated equipment ordinarily used and the need of experienced men to operate them. Not until the kinds of timber long used and considered almost indispensable for certain purposes grew scarce and rose alarmingly in price did wood users consider seriously the possibility of consuming less wood by making it last longer.

As a rule preserving plants have been located at lumber centres, where a large business might be expected, and it has often been necessary to pay transportation charges to and from the treating plant on timber needed for local uses, such as for ties, posts and poles. The equipment of the open-tank method, which consists of an open tank, capable of withstanding heat and either equipped with steam coils or so arranged that fire can be placed underneath, is so simple and comparatively so cheap that it is within reach of the smaller companies, contractors and farmers. The fact that it is portable gives it a distinctive value, since it can be taken, if necessary, into the heart of the forest and even into the mountains.

One of the chief advantages of the open-tank process is that it can be effectively applied to parts of timbers which are espe-

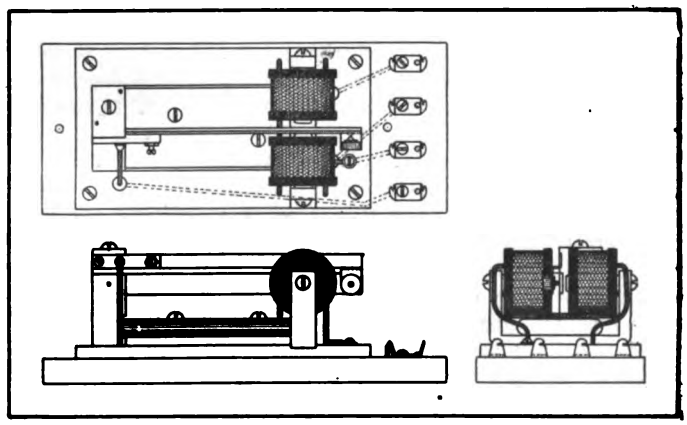

Fig. 4.—Commercial type of high frequency alternating current relay shown diagramatically in Fig. 3.

cially subject to rapid decay, such as the butts of fence posts and telephone poles, without wasting preservatives on other parts. It is also especially adapted to the treatment of mine props, small dimension timbers, cross-ties, piling and shingles and timbers in small sizes of loblolly pine, black and tupelo gum, western yel-

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low pine, and lodgepole pine, and similar kinds of wood. Fairly good results have been obtained in the treatment of arborvitæ, chestnut and red oak, but the experiments thus far do not warrant the application of the method to the treatment of piling and ties made of these woods.

The open-tank treatment is being rapidly developed, and while it ordinarily does not secure so deep a penetration of the chemicals as the retorts it is sufficiently thorough to protect timber for practical purposes in many situations, and it is probable that future experiments will further extend its application.

Circular 101, just issued by the Forest Service, United States Department of Agriculture, describes and illustrates the open-tank equipment. It can be had upon application to the Forester, United States Department of Agriculture.

The Passing of Fred De Land

By a Special Correspondent of the American Telephone Journal at Pittsburg, Pennsylvania.

IN a dark, dingy office on the fifth floor of an old building in Smithfield street, Pittsburg, the last feeble pantings of a decrepit organization are heard. A single, lonely stenographer does triple duty. She is office boy, general information bureau, and between times she opens a few straggling letters that find their way to the office, or writes a puerile missive for her pompous master. On the door there still remains the suggestive name—thrice suggestive to all well posted telephone men—"Federal Telephone Company." Pittsburg is not mourning over the dying obsequies of this conglomerate organization. It is only waiting impatiently until the last vestige of a company that never had any standing among reputable business men shall have vanished from the Smoky City.

Over four years ago there might have been written on the door of the Federal Telephone Company's office in the Bissell Block the telltale message, "Discovered." The American Telephone Journal revealed the true purpose of his telephone activities in an editorial article published under the caption "To Put an End to Foul Fighting," which appeared March 28, 1903. Then it was stated to the entire world that De Land was "a henchman for the Bell company." From that time it was impossible for him to continue to sail under the false colors he had raised, and it has been at least three years since Fred De Land's so-called telephone company showed any signs of real activity. For months it has been a case of burying the corpse, and although the consequential braggart who has served the Bell company's interests so long and so faithfully still sits at the head of the coffin, he is only there by sufferance, and the public has long since ceased to recognize him as a factor in the telephone world.

Away back in 1899 the crafty Mr. De Land imagined that he saw a fertile field for his tricky genius in Greater Pittsburg. About that time the lines of the Pittsburg & Allegheny Telephone Company were spreading out in every direction. Only one way seemed open to stop its thrifty efforts. This was to start another company that should pose as Independent.

The Federal was created. Pittsburg was duly informed with a great spread of newspaper publicity that another Independent company had invaded the field. From the day it got its charter the Federal Telephone Company played the baby act. It was always being abused. The P. & A. Company was always trying to put it out of business. Its one plea with borough councils and township authorities was that it was being singed right and left by the great "Independent Trust," which name it always gave to the P. & A. Company. De Land's tongue was smooth and oily. His methods were crafty. His eye had a peculiar expression that an honest man never forgot. His stories were well conceived, and for years carried a fair measure of conviction with them. He enlisted some of the heaviest financial interests in Pittsburg in his scheme, so that the Federal was able to keep up a large force of employees, and to meet its obligations promptly.

The methods of the expiring Federal company were fairly successful at the start. Its agents applied to the authorities in every borough in the Greater Pittsburg district for franchises and rights of different kinds. In many of these boroughs they secured what they wanted. This was not done without a large expenditure of cold cash. The total of their outlay is estimated by conservative business men to have been about $1,250,000, quite a considerable sum to spend for eight years' unwholesome notoriety.

The Federal built an exchange at Carnegie, a few miles out of Pittsburg. It also put in exchanges at Washington, Pa., Canonsburg, Pa., McKees Rocks, Pa., Bellevue, Pa., Sewickley, Pa., Verona, Pa., Wilkinsburg, Pa., and New Kensington, Pa. Other towns in the upper Monongahela Valley were provided with its service as a liberal expenditure. Lines were extended over into eastern Ohio, and a line was run from Bellevue, Pa., down to Rochester on the Ohio river, one of the most important telephone centers within a radius of fifty miles of Pittsburg. In some of these places the exchanges deserved the name. In McKeesport, Pa., a city of 35,000, and one of the biggest manufacturing towns in Pennsylvania, it bought its plant for a cool $100,000. Several of the other exchanges cost from $15,000 up, but they were not all of this type.

In these surrounding boroughs the Federal's methods were not easy to combat at first. Its agents solicited business on a $12-a-year contract, promising free service into Pittsburg in addition. Its subscription lists were swelled quite rapidly by this persuasive argument, which neither the Bell nor the P. & A. could meet in actual service. But subscribers soon agreed that its free service to Pittsburg was a "rank fake." For a few months a pretense of service would be kept up, but the subscribers soon tired of kicking, and dropped off by the dozen. In many boroughs the local service never amounted to the cost of the contract given for it.

At last the time for exposure came. When the true aim of De Land was known, his nondescript organization was kicked and cuffed and knocked about, both in the daily press and in forcible reminders from business concerns to whom it had promised service.

The Federal Telephone Company has sold several of its exchanges, ostensibly to the Bell people. It had miles of streets poled in the different boroughs, and these poles, with the franchise rights, have been sold to The Allegheny Lighting Company and The West Pennsylvania Railways Company. Other concerns have been buyers at the Federal's bargain sale. Now De Land actually announces that the Federal corpse will soon cease to breathe. The other day he said: "Yes, we are going out of business. We have sold everything that we can, and will shortly close our office." De Land forgot to mention that he thinks his long experience in the Pittsburg field has so well qualified him to do his class of work for the Bell interests in other sections that he is going to try to remain in the business, but his footprints have been watched closely. Several weeks ago an Independent company in the vicinity of Boston was cautioned to look out for De Land. It is rumored on good authority that he attempted a short time ago to lay a net for the Independent companies in New England and was spending a good share of his time lining up a scheme similar to that which he worked, or tried to work, in the Pittsburg district. But his day is past. His methods are obsolete, and if he can still obtain employment from the Bell interests his connection must be more direct, more wholesome, and more useful.

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TELEPHONE DEVELOPMENT IN LIVERPOOL.

CONSUL J. L. GRIFFITHS of Liverpool has recently reported that the total number of telephones in that city and suburbs was 21,415 on December 31, 1906. Comparison of this number with the population of the city, which is approximately 1,020,000, shows that the development is very low as compared with that in corresponding American cities. The Consul states that the absence of competition, there being but one system in that district, and the disinclination to adopt the latest improvements in the mechanical and electrical devices, impairs the efficiency of the service. Another thing which tends to keep the number of subscribers low is the requirement that rental shall be paid for the entire year in advance. It is stated that the long distance service is not to be compared with that in America.

THE QUESTIONS PEOPLE ASK THE OPERATORS.

W. I. ALLISON, manager of the Home Telephone Company, Bowling Green, Ky., has been keeping records of unusual questions asked the operators in his exchange. Here are a few of them:

"Where must I call to pay my water rents?"

"Give me the paint shop on the Square." (Opr.)—What paint shop? "Why the one on the Square."

"Can you give me the parties' name over a store on Main street?" (Opr.)—What parties? I don't know who they are. "That live over the store on Main street."

"Central, connect me with Mr. Jenkins' telephone. He lives four miles in the country; he is a cousin of mine; I don't know his number."

"I have been waiting for a street car some time; can't you tell if they are going to run to-day or not?"

"My husband is going away on the train. He is down at the station. I must speak to him before he leaves. Who can I call that can get him right quick?"

"I want to talk to a lady that lives on Kentucky street. I don't know the lady's name she boards with. I thought maybe you would know?"

"Can you tell me how old George Washington is?" (Central referred her to the Chief of Police, where the desired information was found.)

"Central, I want to get a curtain stretcher. What kind of a store will I have to call?"

"I want to go shopping at a shoe store. What must I ask for if I don't want slippers?"

"I live at 1040 Main street. Connect me with that number."

Sometimes the operators receive queer information along with questions. The following is a sample.

"Central, there is a mad dog in my house. Who must I call to get him? He is under my bed."

CHURCH SERVICE FROM REGULAR TELEPHONE INSTRUMENTS GIVEN AT MT. MORRIS, NEW YORK.

H. W. WIGHTMAN, manager of the Livingston County Telephone Company, Mount Morris, N. Y., reports that he has recently installed telephone transmitters in several of the churches in that city and that many subscribers who are unable to attend church are now hearing the services, although they remain in their homes.

It is stated that the experiment has proven a success, patrons claiming that they can hear the sermons more distinctly than when present in church.

Calls have been received by Mount Morris from telephone subscribers in Rochester who had heard of the innovation, and it is stated that the service to that city was practically as satisfactory as that received by the local subscribers.

In giving this service Mr. Wightman employs only the regular common battery transmitter mounted on the pulpit and cut in series with the line, no other apparatus being used, aside from a switch for closing the circuit.

LOSS OF LIVES DUE TO THE ATTACHMENT OF TELEPHONE LINES TO ELECTRIC LIGHT POLES.

A REPORT from Fort Worth, Texas, states that four telephone linemen have recently been killed in that city while repairing telephone lines strung on poles carrying electric light wires. So timid have the linemen become that they are very much averse to working on wires attached to these poles. The telephone company, realizing the dangers to which its men are subjected, has issued orders that all linemen and troublemen who are assigned to work on a line which is found to run on a lighting company's poles shall let the wire alone until they have reported back to the office, and received instructions covering a safe means of repairing the fault.

A Plan for Facilitating Rapid Measurement of Resistance with a Voltmeter

By F. C. Greenwald.

IN small exchanges where no bridge is provided for testing the manager often goes without needed information about the resistance of a drop, ringer or impedance coil winding, because it does not occur to him that he can easily make the desired measurements with a voltmeter. The method of making resistance measurements with the voltmeter takes into account the resistance of the instruments and the voltage of the battery with which it is used. By figuring on always using the same voltage, a manager can work out for himself a resistance table by means of which it will be possible to tell by a glance at the scale the resistance, within a few ohms, of practically any piece of apparatus he is likely to use.

Makers of voltmeters usually stamp on the case or affix to the instrument in some manner a notation indicating its resistance. If this is not found on any particular instrument, it is necessary to ascertain, by measurement with bridge or ohmmeter, the resistance of the voltmeter coil and movement. If the instrument is provided with two scales, the two corresponding resistances should be determined. These can be measured fairly accurately by connecting the instrument across a good toll line on a day when the weather conditions introduce no complications, and letting a wire chief at the distant end of the line test with his bridge. The resistance of the windings may also be obtained by connecting the voltmeter in series with a constant source of current, noting the reading and then introducing known resistances in the circuit until the indicator shows a reading just one-half of the first reading. The sum of the resistances thus introduced will equal the resistance of the winding of the voltmeter.

Some voltmeters have one scale, with divisons reading from 0 to 3 volts and another set of divisions reading from 0 to 150 volts. The low reading scale, used with a voltage of 3 volts (two dry cells in series), may well be used in ascertainng values of small resistances. The large scale should be used for measuring comparatively large resistances, and should be used in connection with a constant higher voltage, say the 60 volts, which the table man may be using for insulation resistance measurement of his various lines.

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The method of making a test is as follows: The voltmeter and test battery should be connected in series, as in Fig. 1, and when the circuit is closed by a short circuit applied in any convenient manner at x the voltmeter will indicate the strength of the test battery. For the sake of obtaining figures to work out a sample resistance problem, the writer has assumed that this is three volts. Next the battery, voltmeter and drop coil or other objects should be placed in series, as in Fig. 2.

The reading of voltmeter should then be noted. In the sample

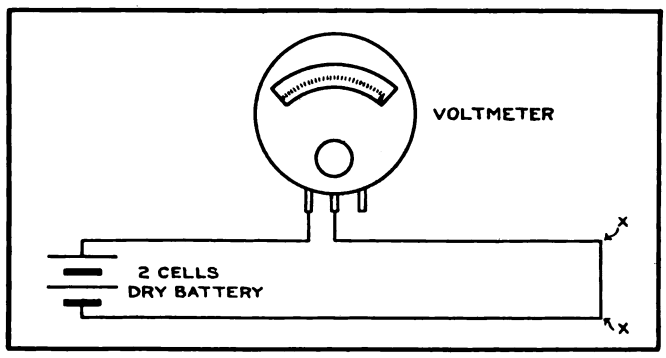

Fig. 1.—Connections of voltmeter for ascertaining voltage of battery.

problem given in this article it is assumed that this reading is 2.4, the resistance of voltmeter being 534 ohms.

The formula for the solution of the problem is:

$$R = r\left(\frac{V_1}{V_2}\right) - r,$$

R being the unknown resistance, r the resistance included between the terminals of the voltmeter, V_1 the total battery voltage

Voltmeter reading.	Resistance.	Voltmeter reading.	Resistance.
150	0	125	106.8
149	3.6	120	133.4
148	7.2	115	162.4
147	10.9	110	194.1
146	14.6	105	228.7
145	18.4	100	266.8
144	22.2	95	308.9
143	26.2	90	355.7
142	30.1	85	407.9
141	34.5	80	466.4
140	38.1	75	533.7
139	42.2	70	609.9
138	46.4	65	698.5
137	50.6	60	800.4
136	54.9	55	921.8
135	59.3	50	1067.3
134	63.7	45	1235.3
133	68.2	40	1467.7
132	72.8	35	1753.5
131	77.4	30	2134.8
130	82.1	25	2668.5
129	86.9	20	3469.0
128	91.7	15	4803.3
127	96.6	10	7471.8
126	101.6	5	5477.3

Table A.—Sample card showing resistances corresponding to readings on low scale of voltmeter (150 divisions) when corresponding resistance of instrument is 533.7 ohms and 3-volt battery is used.

and V_2 the reading obtained with unknown resistance in series with battery and voltmeter. Substituting the figures assumed, an example works out as follows:

$$\text{Unknown resistance} = 534\left(\tfrac{3}{2.4}\right) - 534$$
$$= \frac{534 \times 3}{2.4} - 534$$
$$= 667.5 - 534$$
$$= 133.5 \text{ ohms.}$$

Following this idea, it is an easy matter to work out results for all divisions of the scale from 150 or 3 down to 0. Some men who have done this carry cards on which are written figures for use in connection with high voltage and the high scale, and also figures for use with low voltage and the low scale. Others even write such figures on the scale of the instrument itself, thereby being enabled to use this idea in connection with their everyday tests should they so desire.

The advantages of the idea possibly may be made more clear by the copies of the notation appearing on two such cards shown in tables a and b. These tables, however, will not be accurate for general application, as their reliability depends on the resist-

Voltmeter reading.	Resistance.	Voltmeter reading.	Resistance.
60	0	20	53480
59	453	19	57681
58	922	18	62393
57	1407	17	67581
56	1910	16	73510
55	2431	15	80220
54	2951	14	87289
53	3536	13	92675
52	4114	12	109060
51	4719	11	129114
50	5348	10	133700
45	6180	9	151526
40	13370	8	173810
35	19100	7	202460
30	26740	6	240660
25	37436	5	294140
24	40310	4	374360
23	43016	3	508060
22	46187	2	775460
21	49660	1	1577660

Table B.—Figures worked out similar to those in Table A for high resistances. Used with high voltage scale of instrument, corresponding resistance 26,740 ohms, and 60-volt battery.

ance of the individual instrument for which they were designed. It is necessary to always use the same voltage of battery, otherwise the tables are valueless. When properly used they result in a saving of time which much more than compensates for the labor of preparing them.

PROGRESS OF BELL—RAILROAD COMMISSION RATE REDUCTION CONTROVERSY IN LOUISIANA.

THE case growing out of the order issued by the Louisiana Railroad Commission on Aug. 6, 1906, commanding the Cumberland Telephone & Telegraph Co. to reduce its rates 15 per cent. in that State will probably be heard by United States District Judge E. D. Saunders in New Orleans next week. The commission and the Cumberland company have each taken a decisive stand in the matter and each is determined to fight the case through the United States Supreme Court.

For months the Cumberland company paid no attention to the order, but when pressed this summer by the Commission it made the plea that the reduction was unjust in view of the

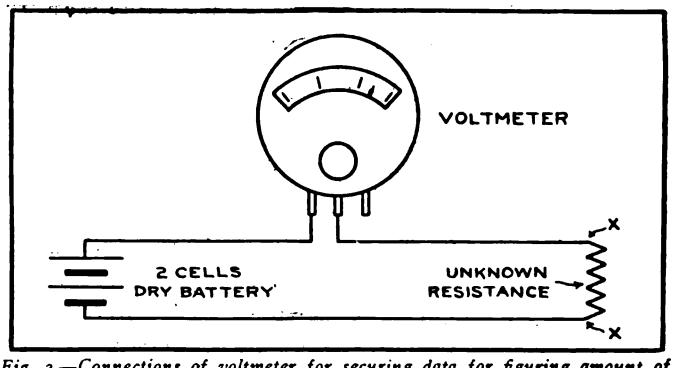

Fig. 2.—Connections of voltmeter for securing data for figuring amount of an unknown resistance.

immense expense necessary in maintaining the system against "wear and tear." The Commission then let matters hang fire for a time, while W. M. Barrow, secretary of the Commission, went to the company's headquarters at Nashville, Tenn., to investigate its books. On his return to New Orleans he reported to the Commission that the claim of expense for maintenance was entirely wrong and was not supported by the company's books. On the business done last year the reduction of 15 per cent. would have cost the company $40,000. Secretary Barrow states that the company's books show a net income of $250,000 from its Louisiana lines last year permitting the company to declare a 7 per cent. dividend and putting aside $60,000 for surplus, etc.

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The company's suit for injunction was filed before Judge Saunders last November, but the court failed to grant the injunction prayed for. On July 29 of this year Judge Saunders gave each side ten days in which to prepare its evidence, and he will probably hear the case in a week or ten days. The officials of the company have already declared that they would take the case to the United States Supreme Court if the decision was against them, and the members of the Commission have intimated that they would do likewise in the event of an injunction being granted by Judge Saunders.

HEAVY LONG DISTANCE BUSINESS IN INDIANA DURING STRIKE OF TELEGRAPH OPERATORS.

THE resources of the Indiana telephone companies, and especially the long-distance lines, are being taxed to their utmost capacity to take care of the increased business due to the telegraphers' strike. The relay men are working hard to help out business men and the newspapers. It is not uncommon for business men to offer to pay extra prices for the prolonged use of the lines during portions of each day.

BELL COMPANY WITHDRAWING FROM PETERSBURG, IND.

THE Cumberland Telephone & Telegraph Company has entered upon the work of dismantling its system in Petersburg, Ind. The company is reported to have decided upon this course rather than submit to the demands of the city for the payment of $500 for a renewal of the franchise. The company has a large number of ten year franchises in Indiana which are about to expire and did not wish to set a precedent for other towns and cities to exact a similar or larger price for a new franchise.

SPOKANE CITIZENS WANT FORFEITURE CLAUSE IN NEW BELL FRANCHISE.

MAYOR MOORE and members of the city council of Spokane, Wash., have been petitioned by the 150,000 Club of that city to insist upon the insertion of a forfeiture clause in the franchise for the Pacific Telephone & Telegraph Company when it asks for a renewal. The franchise was granted to W. S. Norman, of Spokane, 10 years ago, and turned over to the company later. The club adopted this resolution:

"Resolved, That in view of the present extremely inefficient service of the Pacific Telephone & Telegraph Company, and its apparent inability or disinclination to remedy same, the mayor and city council be urged to see that a forfeiture clause, applicable to similar conditions, and other safeguards be inserted in the franchise of said company if it should ask for a renewal of same at the expiration of the present franchise, Dec. 14, 1907."

INDIANA JUDGE HEARS CASES OVER TELEPHONE LINE.

LONG-DISTANCE justice was handed out last week between Indianapolis and Muncie, Ind., by Judge Frank L. Gass, who is Police Judge of Muncie. Judge Gass heard the charges against wrong-doers, their pleas of guilty, and assessed the usual fines over the telephone. He was in Indianapolis while the prisoners were arraigned in Muncie.

CHINESE ARRANGING FOR MORE RAPID DEVELOPMENT OF TELEPHONE SYSTEMS.

IN the annual report of the Imperial Telegraph Administration of the Chinese Empire, prepared by Mr. F. D. Cloud, student interpreter at the Shanghai consulate-general, it is stated that telephone systems in China are likely to increase in number and size rapidly within a few years. Wherever the telephone is used by the Chinese it gives good satisfaction, and in the development of the new plans for exploiting the commercial resources of the Empire it is likely to play an important part. At the present time there are many parts of the Empire where there is talk of organizing telephone systems. It is certain that a large number of these will soon be installed, and their construction will open up a considerable market for telephone supplies of foreign manufacture, as no material of this sort is manufactured in China.

AMOUNT THAT EXCESSIVE HEAT INCREASES LOAD IN EXCHANGE, AS SHOWN BY PEG COUNT.

THE peg count taken recently in a Pacific Coast City shows the great extent to which the telephone is used on a day when the heat is so intense as to cause people to stay indoors as much as possible. The records of the telephone company show that the number of calls on a very hot day recently was ten per cent in excess of the normal. The average summer day's use of the telephone, as indicated by a peg count of July 10th in the city in question, is about 207,000 calls, but on the two very hot days when special records were taken the numbers of calls were respectively 235,000 and 228,050. Not only was the number of calls throughout the entire day much higher than usual, but the peak of the load curve ran much higher, as during the middle of the day the telephone was practically the sole method of communication employed in the entire city.

SLIGHT ADVANTAGE GAINED FOR INDEPENDENT TELEPHONY IN CONNECTICUT.

AFTER a long and vigorous campaign, the Independent telephone interests which have been making representations to the legislature of the State of Connecticut throughout its present session have secured the passage of an act permitting the incorporation of companies to do a telephone business without a special charter. Hitherto no telephone company could be incorporated for the purpose of operating a system to compete with the Bell company, which is strongly intrenched in the State, without securing from the legislature a special charter and obtaining from the courts a decree that its proposed system would serve the public necessity and convenience.

What is in some quarters called a compromise measure has been passed by the legislature and signed by the governor and goes into effect on September 1st of this year. It permits the formation of a corporation to engage in telephone business without obtaining from the legislature a special charter; the requirement that before building a system the new telephone company shall obtain a ruling from the court that its service is a matter of local convenience and necessity has not been done away with, however. This provision will probably be made use of to very considerably impede the progress of Independent companies of Connecticut until done away with by the action of the future legislature.

ATTORNEY GENERAL OF LOUISIANA ADVISES THAT CHARGING FULL NIGHT RATE IS ILLEGAL.

JUDGE WALTER GUION, the attorney general of Louisiana, has issued a circular letter, officially advising the public that the Cumberland Telephone & Telegraph Company had no authority to charge patrons any more for night and Sunday messages than formerly.

The letter follows the refusal of Judge E. D. Saunders, of the Federal Court, to grant the Cumberland an injunction restraining the Railroad Commission from interfering with the Cumberland, who had issued an order declaring that night messages and Sunday messages would be brought up to the rate of regular day messages.

LARGE BILLS FOR TELEPHONE SERVICE PAID BY TRAVELLING MEN.

BROKERS and travelling men are using the long distance telephone throughout the country for the transaction of all urgent business, on account of the strike of telegraph operators. A typical report comes from Anderson, Indiana, where a drummer's bills for long distance service in a single evening amounted to eight dollars. Local branches of manufacturing concerns having offices in large cities have been compelled to make extensive use of telephone lines.

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Editorial Opinions

"LONG DISTANCE" TO THE RESCUE.

LITTLE surprise has been occasioned by the fact that business has not been very severely tied up by the strike of telegraph operators which has been in force in many parts of the country for a few days past. Men who had urgent communications to transmit found that the long distance telephone answered their purpose admirably, and turned to it as a means of handling a large number of messages which would otherwise have been given to the telegraph companies. The result has been that practically all the important long distance lines have been working at their fullest capacity ever since the strike was called.

This state of affairs has more than a passing value to telephone companies. There are many persons who, in the nature of things, remain ignorant of the best methods of conducting details of their own affairs until improvements are literally forced upon them. Then they see their value at once and lose no time in adopting them. There is no doubt that business men who have not hitherto been very constant users of the long distance lines will discover some of the numerous points of superiority of telephone service over the slower and less direct method of communication. Hereafter they will prefer to put themselves more frequently in direct personal touch with distant correspondents.

It is true that owing to the congested condition of lines and the strain upon the operators, long distance business has in many cases been handled at less than normal efficiency. In spite of this, however, the telephone service has made a distinguished demonstration of its value, and a considerable amount of permanent new business will be acquired by telephone companies as a result of the enforced use which is now keeping their wires hot.

KEEPING IN TRAINING.

ONE of the principal assets of the engineering department of every large telephone company is a set of specifications and drawings, covering methods of doing work which are so satisfactory that they have been adopted as standards, to be followed without essential deviations in all work of the class to which they apply. They form a library of ready reference which is capable of affording guidance to employees when they are called upon to undertake a piece of work with which they are not wholly familiar. It is for this purpose that specifications are made. The object of their creation is to put the experience of the wisest and most skillful telephone man either directly or indirectly at the disposal of every workman in order that he may make this knowledge, so laboriously acquired by other men, tell to the utmost advantage of the company in the work he is doing.

It is surprising that the essential character of specifications is not more clearly understood by the men who use them. It seems certain that if it were the handling of them would have a deeper influence upon methods of work and study. The lesson they teach to the individual is that efficiency in his department—or, to put it more broadly, in a company, or an industry, is gained by recognizing all the good which has been brought out by experience in the past, and putting full information about it in the form of a clear, definite description. This description is set forth in such form as to be permanent and readily accessible. Thus what has been once acquired need never be lost.

If individuals would only be careful of their own personal experience, if they would seek diligently for the essential fact underlying each act they perform in doing their work, and preserve carefully the knowledge thus acquired, we would hear less talk of dissatisfaction from men in all grades of employment. A man who examines into his work studiously will see that each job upon which he is engaged offers him many opportunities of broadening and strengthening his general knowledge of the business.

Telephone men should realize the importance of keeping whatever information they gain, day by day, from eventually slipping out of their grasp. Perhaps it is worth while to illustrate how this can be done by citing an example. A man interested in circuits when he first enters telephone work will either try to remember every circuit on which he works, or will copy many drawings in a note book. After a while he finds that in the first case his memory fails to retain details, or in the second that he has wasted much time in copying information that is valueless, the more so as much of it is many times duplicated. What he needs is a collection of well-selected drawings of groupings of essential apparatus in the several typical forms of circuits. These not only furnish him all the information he needs, but keep it in a compact form.

Other illustrations may be drawn just as readily from the operating, or contract, or accounting departments. The principle is broad enough to have an application for everyone engaged in any branch of the telephone business. The point is to be careful and select for preservation only that which is essential. Then, once it is chosen, keep it where it is ready for immediate reference, and use it occasionally.

A man who adopts a well chosen system of note-taking, and keeps it up persistently always has a means of deriving the full value from his experience gained in old work. He can at any time fully review his past efforts as a preparation for new tasks. Such reviewing, periodically undertaken, puts his mind in a condition which is equal in efficiency to the physical perfection of the athlete who is always in training.

NEW INDORSEMENTS OF THE BENEFITS OF TELEPHONE COMPETITION.

TWO notable expressions in favor of competition in telephone service have recently come from official sources in the State of New York. One is that of the special committee of the Board of Aldermen of New York City, which has just investigated certain phases of the local telephone situation. This committee in its report criticized especially the failure of a reduction in rates for pay station service, which was announced with much flourishing of trumpets about a year ago when there was much talk of competition among the people of the city, to accomplish the results expected. As a matter of fact nearly everybody using a telephone pay station in New York City at the present time pays just as much per call as he did before this announcement was made. This case is cited as a typical example of defects in the service which are the "outgrowth of an unrestricted and untrolled monopoly." Coming as it does from a body of men who have given serious consideration to the question from the viewpoint of persons who, although not themselves familiar from long experience with the benefits of competition, are well acquainted with the faults due to its absence, this statement should carry weight.

No less an authority than a justice of the Supreme Court of New York State has furnished the second strong statement of a conviction that competition in telephone service conveys upon the public important benefits. He not only expressed in court an opinion in favor of competition in telephone service but based a decision in a very important case upon the principle that a contract which tended to restrict such competition in a particular instance was invalid, as against public policy. While this case, reported in our last week's issue, is likely to prove of great value to Independent interests, the indorsement of the benefits of competition by the justice is a general expression which cannot fail to afford them much satisfaction. It is noteworthy that this second endorsement of the principle comes from a city where there is established competition in telephone service, and undoubtedly the personal opinion of the justice is not at variance with the judicial views based upon an extended and impartial consideration of the matter in all its phases.

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From a Legal Viewpoint

CONDUCTED BY A. H. McMILLAN.

PHYSICAL CONNECTION COMPELLED IN MONTANA.

A DECISION which is attracting much attention throughout the country is that compelling the Rocky Mountain Bell Company to furnish toll connections to Independent companies in Montana.

Section 14, article 15, of the constitution of Montana provides:

"Any association or corporation, or the lessees or managers thereof, organized for the purpose, or any individual, shall have the right to construct or maintain lines of telegraph or telephone within this State, and connect the same with other lines; and the legislative assembly shall, by general law of uniform operation provided reasonable regulations to give full effect to this section. No telegraph or telephone company shall consolidate with, or hold a controlling interest in the stock or bonds of any other telegraph or telephone company owning or having control of competing lines of telegraph or telephone."

Section 1001 of the Civil Code of Montana provides:

"Any association or corporation or the lessees or managers thereof, organized for the purpose, or any individual, shall have the right to construct and maintain lines of telegraph or telephone within this State and connect the same with other lines, and in case such persons or corporations cannot agree as to the compensation to be paid for the privilege of such connection, the acquiring of the right by the one to use the line of the other may be had in proceeding under the code of civil procedure and the damage assessed and the right of connection granted as provided in the civil procedure."

Relying upon the above statute, the Billings Mutual Telephone Company, a corporation, brought suit in the Circuit Court of the United States for the District of Montana to compel the Rocky Mountain Bell Telephone Company to give it the right to connect its telephone line with the long distance telephone line of the Rocky Mountain Bell Telephone Company at Billings upon such terms as the court should deem just, the court to proceed by law to determine the right to connect and the value of the service and use of defendant's line. The Rocky Mountain Bell company denied, in its answer, that the connection would be any convenience to the public generally, and asserted that such use and connection as the plaintiff desired was against the laws of the State of Montana, and contrary to the provisions of the 14th amendment to the Constitution of the United States. The testimony of a number of skilled engineers was taken to controvert assertions that insurmountable physical obstacles would prevent such a connection.

The court held that the plaintiff was entitled not to only actual physical connection of telephone systems, but also the right of use of the defendant's lines. The court found that the use sought by the plaintiff company was feasible by a plan of trunking between the exchange, where the respective switches and toll boards were maintained. Said the court: "In other words, where two companies owning different lines of telephones in Montana cannot agree upon the compensation for the privilege of connection and use, the law of Montana obliges the one to submit to connection with the other, and (upon payment of damages to be assessed) to accept the patronage and to submit to a necessary use that it might not wish to accept or allow, and probably could not be compelled to accept or allow, were it not for the provisions of the constitution and laws of the State."

ACCEPTANCE AND ABANDONMENT OF FRANCHISE.

A TELEPHONE company refused to furnish telephones at the statutory rate, so that the city in which it was operating repealed its original franchise ordinance, whereupon the telephone company brought suit against the city for damages sustained in the destruction of its property. The city soon afterward instituted suit for the removal of the company's poles and wires from the streets. The contention went on from 1886 until 1887, when a stockholder of the company, the subscribers of which had been reduced to 37, sought and obtained a new franchise ordinance, which provided that it should terminate after 15 years. The original franchise which had been repealed was without limitation in point of time. After the passage of the ordinance, in 1887, the company began to rebuild its exchange and system, and the litigation between the company and the city was allowed to lapse. At the expiration of the latter ordinance, trouble again arose between the city and the company, and became so acute that the company was compelled to start a suit to enjoin the city from destroying its telephone plant. The company based its right to an injunction upon the latter ordinance, but the court held that the company had accepted the franchise of 1887 and was estopped thereafter from claiming any further rights under the original franchise. The right of injunction was therefore denied. Cumberland Telegraph and Telephone Co. vs. City of Evansville, 143 Federal, 238.

EFFECT OF OCCUPATION OF LAND AS NOTICE.

In a recent issue (Vol. 15, No. 26, page 432) we noted, with interest the enclosed article referring to a case in Kentucky. Will you kindly state, for our benefit, if the same laws apply in New York State, that is to say, if we had written agreement from the owner of the land, but which had never been recorded, and then that property was sold, and some time afterward the new owner ordered us to remove the poles, would this agreement still give us the right to maintain the line upon his lands; that, is could not the new owner compel us to remove the poles, nothing having been on record at the time he made the purchase, and we having no permission from him for the occupancy of the land? L. H. Y.

THE item above referred to stated that the Court of Appeals of Kentucky had held that an agreement giving the right to erect poles upon land need not be recorded in order to give it legal effect where the company is in actual occupancy of the land, the company's visible occupation constituting due notice to any purchaser of the company's rights. Denton vs. Cumberland Telephone & Telegraph Company, 96 S. W., 1112. The same law should hold good in the State of New York. Therefore, if you had an unrecorded written agreement with the land owner, which in itself was sufficient to give you the right to occupy the land with poles, and which had not expired by its own terms, the new owner of the land would be bound by the agreement, you being in visible occupation of the land, and he could not compel you to remove the poles, even though you had no permission from him to maintain your line. The principle upon which this decision rests is one that is generally recognized throughout the United States. It is the same principle that leads the courts to hold that when a piece of property is sold with a tenant living upon it, a new owner is held to have notice of the tenant's rights, because the latter being in visible occupancy of the land the purchaser should have inquired what the tenant's rights were at the time of the purchase and that thereafter no change in those rights may be effected, excepting by agreement between the tenant and the new owner.

CONSOLIDATION CONTRACTS ARE BINDING.

BY a decision of the Circuit Court at Owensboro, Ky., the temporary injunction granted the Kentucky and Indiana Telephone Company was made perpetual and the latter company is enjoined from severing its connection with the Kentucky and Indiana Company and must carry the latter company's messages without unnecessary delay or discrimination which would hamper its service.

The suit had its inception about six months ago when the Rural Telephone Company suddenly ceased its connection with the Kentucky and Indiana company and began to operate in conjunction with the Cumberland telephone exchanges. The Rural people claimed that its contract with the former company had expired.

By the decision of the court it follows that a telephone company cannot sever its connection with another telephone company after a consolidation contract by which one of the companies handled the orders and messages has been effected.

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A Home-Made Lineman's Test Set

By C. I. Stocking.

CIRCUITS embodied in a lineman's test set which the writer has had made and used offer some advantages which may afford interesting suggestions to other managers. The wiring of the set, shown in Fig. 1, indicates the method of connecting up the apparatus. This set is equipped with a generator arranged to furnish both alternating and pulsating currents, generator key, hook switch, receiver, ½ M.F. condenser, induction coil, transmitter, 80 ohm ringer movement, a master key and two dry batteries.

By tracing this circuit it may be seen that with all keys in their normal position, as in the digram, it is a straight series

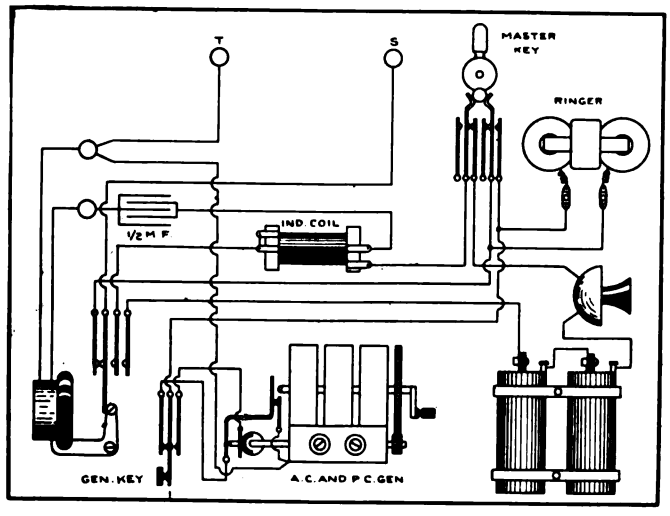

Fig. 1.—Circuit of home-made lineman's test set.

set. When the master key is thrown to close the springs shown at the right the ringer circuit is shunted, leaving the generator bridged directly across the line. Under these conditions the troubleman may make rough tests to get some idea of the distance to the trouble by observing the pull of the generator, in case of a short circuit.

When the master key is thrown in the position to operate the springs at the left it opens the transmitter circuit, leaving only the receiver and condenser across the line. This is done to prevent the transmitter from picking up any noise caused by the wind, humming of the wires or any other disturbance. The condenser makes it possible for the different stations to continue ringing one another while the troubleman is on the line.

Pressing the generator key connects the pulsating contact of the generator in circuit, and by turning the generator in one direction it is made to give out positive current, while turning it in the opposite direction causes it to give out negative current. This feature of the set makes it very convenient for testing on "plus and minus" party lines. It also helps in testing rural lines, which is a very difficult thing to do at times on account of receivers being taken down when a signal is heard. If circuits are arranged, however, so that the exchange drop is rung down by pulsating current, which does not ring the subscribers' bells, a call from the test set leaves the line clear of eavesdroppers and satisfactory test can be made.

There is one more feature about this set which makes it complete, and that is provided so that if the wire chief in the office is making a test with a troubleman, and wishes a short circuit on the line, it can be furnished instantly. All the troubleman has to do is to place his receiver on the hook and throw the master key to operate the right hand springs.

Fig. 2 is a photograph of this set mounted in an old telephone generator box of the large type, equipped with forty feet of flexible twisted paired cord having a test clip attached to one end of each strand.

After nearly two years' service the writer has found that three of these sets, made in the company's workshop from material which could not well be used for anything else, are still in condition to give very satisfactory results, and the men are much pleased with them.

A BAD RESULT OF SPARROW SHOOTING.

By J. F. Breithaupt.

TROUBLE tickets showing shorts, opens and crosses of every conceivable variety in a single piece of cable which had been known as good were one day brought to the writer's attention. Tests showed the approximate location of the trouble, and then a lineman was sent up to ride the messenger and examine every inch of the surface of the cable sheath. When he found the cause of the trouble it turned out to be at a place

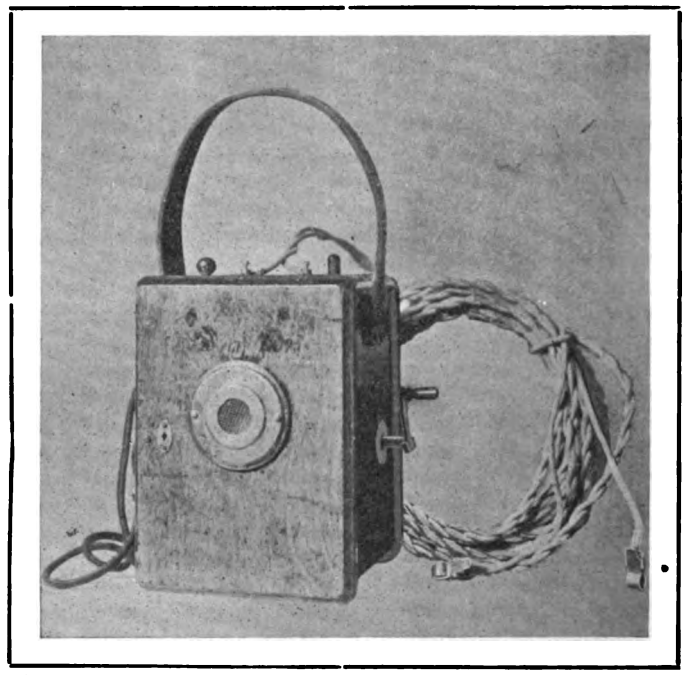

Fig. 2.—View of exterior of lineman's test set, made of old material found in exchange stock room.

where the sheath was perforated by a fair sized hole, and a 22 calibre rifle bullet was lodged among the wires. Investigation showed that certain people had been in the habit of shooting sparrows as they perched on the messenger. The boys were not all good shots.

WANTED—TELEPHONE PHOTOGRAPHS

THE Editor of American Telephone Journal *wants to buy short articles illustrated by photographs showing features of telephone plants and work. If you have views showing good construction outside, neat workmanship inside, men performing any class of work, effects of remarkable accidents, new ideas, send them in. Describe briefly in a letter the circumstances that led you to take the pictures.*

Prints that you like will interest the other fellow, and have a value. Pass them along!

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Selected Telephone News Reports

SCOPE OF PLANS FOR INDEPENDENT SYSTEM AT SPOKANE, WASH.

PROVISIONS are being made by the Home Telephone & Telegraph Company for the installation of 10,000 instruments at Spokane, Wash., where $600,000 is to be expended on an exchange, sub-station and conduits in the business sections of the city. This will give Spokane more than 21,000 instruments, probably a larger number than is operated in any other city in the 100,000 class on the continent. Work is being pushed on the foundation of the exchange building, and the brick and tile construction will begin in a short time, the plan being to have the plant in operation before the end of the year. All the wires in the business and best residential sections are to be underground. The company announces that in addition to police, fire and messenger services, it will conduct an up-to-date information department, giving subscribers the hours of the arrival and departure of steam and electric trains. The company has almost completed its conduit work in the city, and is now setting poles in the outlying districts at the rate of 150 a day.

TEXAS CITIES TO FORCE BELL COMPANY TO PROCURE FRANCHISES.

MAYOR CALLAGHAN of San Antonio is the leader in an attempt to make the Southwestern Tel. & Tel. Co. (Bell) procure a franchise and pay the city proper compensation for the privileges which it enjoys. The progress of the controversy is being watched with much interest throughout Texas. At the present time three other important cities, Texarkana, Dallas and Houston, are engaged in similar conflicts with the company and it is reported that Waxahachie will soon fall in line. If these cities are successful, similar actions will probably be taken up by others in the near future.

PITTSBURG TELEPHONE COMPANIES RESIST MEASURE COMPELLING INSTALLATION OF WIRES UNDERGROUND.

TELEPHONE companies in Pittsburg, Pa., are threatening an advance in rates if the city passes an ordinance which has been introduced in the council compelling wires to be placed underground. The same attitude is assumed by telegraph and by light, heat and power companies.

The measure provides that all wires must be underground by October, 1911, at least one-quarter of the work to be done each year until that time.

The protestants argue that the income from business is not sufficient to justify such action. Action on the ordinance has been deferred until September.

NO AGREEMENT ON TELEPHONE POLICY BETWEEN BELL COMPANY AND ALBERTA GOVERNMENT.

THE provincial government of Alberta and the Bell Telephone Company failed to come to an agreement regarding telephones in Alberta. The province offered to buy out the Bell lines, but the company wanted the southern half of the province, leaving the northern portion to the government. The government would not agree to this, consequently it is "a war to a finish," as one of the cabinet ministers termed it.

WESTERN PENNSYLVANIA TO HAVE INDEPENDENT LONG DISTANCE FACILITIES MUCH IMPROVED.

PITTSBURG is very much interested in a well-founded report that keener competition in long distance service, with consequent increase in the quality of the service, is to result from the recent merger of the Tri-State Company with the American Union Telephone Company. The merger was effected by Judge Umbel, of Uniontown, Fayette County, signing for the Tri-State stockholders, and Frank D. Houck, of Harrisburg, general manager of the American Union, signing for that company.

The American Union Company has formed an alliance and bought out other companies so that now connections can be had as far as Baltimore in the South, and Syracuse and Elmira in the East. Recently this company absorbed the United Telephone and Telegraph Company, which gives it communication with most of the Eastern Pennsylvania cities within a radius of 14 miles of Philadelphia. By this deal Lancaster, Harrisburg, Altoona, Lebanon, Hollidaysburg and other thriving cities were reached. About the same time the American Union took over the Cumberland Valley Telephone Company, making connections necessary for the long-distance plans over the State. The Huntington and Clearfield was afterward absorbed. The Union Telephone Company, of Erie, whose service extends to New Castle, and a few other companies with wires extending west almost to Cleveland and to Chicago were also taken into the new organization.

A representative of one of the companies interested in the Tri-State merger says that the absorption of the Tri-State company would enable the American Union to make long-distance connections with the East from Pittsburg within a few months. He says the merger will undoubtedly improve the telephone service in Uniontown, Connellsville, Washington, Pa.; Canonsburg, Connellsville, Morgantown, Scottdale and the many other towns which formerly used the tri-State service. The American Union Company recently purchased the Bedford County Telephone Company, which was needed to complete the air-line connections between Pittsburg and Harrisburg.

RAISING OF RATES BY BELL COMPANY IN TEXAS ATTRIBUTED TO THE OPERATION OF THE ANTI-PASS LAW.

ANNOUNCEMENTS of increases of rates, to take effect on September 1st, at a number of cities in Texas have been made by the Southwestern Tel. & Tel. Co. (Bell). It is stated that the reason for these increases is to put rates on a similar basis in all parts of the state in accordance with provisions of the "Anti-pass law" which went into effect last month. While this law does not state that rates must be the same all over the state, it does provide that no discrimination in charges or services can be made where conditions are similar. It is the general opinion that where a company operates more than one exchange under similar conditions, rates in all the similar exchanges must be the same.

When conditions are equalized in different parts of the state it is expected that the Independent companies will reap some advantage from the operation of the law, as there can then be no temporary reduction of rates by the Bell company for the purpose of embarrassing a competitor.

CANADIAN RAILWAYS INSTALL TELEPHONES ON TELEGRAPH LINES.

BOTH the Canadian Pacific and Canadian Northern railways have recently installed telegraphone systems for operating telephones on their telegraph lines. The principal reason for this installation has been the convenience of securing help in the shortest possible time after the occurrence of an accident. On the Canadian Northern Railway, however, the wire has been installed between Winnipeg and Brandon and night news is transmitted to one of the Brandon newspapers over this line. This saves the cost of a night operator at Brandon where the ordinary commercial business would not warrant such an expense. The company intends to install a number of other similar wires at Manitoba, the circuits not to exceed 150 miles in length.

Although on the Canadian Pacific the only place where this

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Selected Telephone News

system is in operation in Western Canada at the present time is on the main line between Fort William and Winnipeg, the company is now making preparations to install a system on a number of its branch lines as well as on the main line west.

MAYOR OF EL PASO ENCOURAGES INDEPENDENT TELEPHONE DEVELOPMENT.

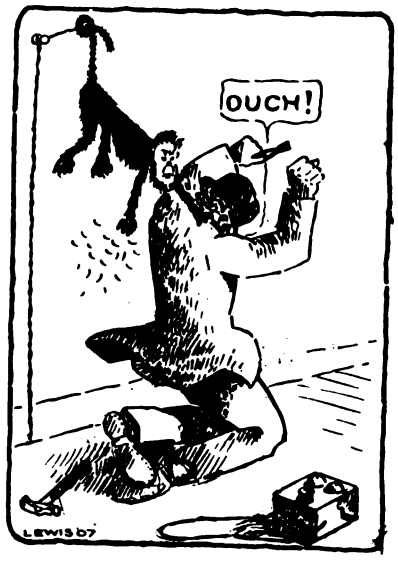
WHEN Mayor Sweeney of El Paso, Texas, called the attention of the Southwestern Tel & Tel. Company (Bell) to the fact that by the terms of its franchise it is obliged to give fifty per cent. discount on all bills paid before the 15th of each month, the company stated that if the provision were enforced it would have to raise rates. The mayor, however, immediately expressed his determination to have the city offices fully equipped with Independent telephones, saying that they would be used to replace even those instruments which the Southwestern Telephone Co. has been furnishing free of charge. He also stated that the county would take similar action in its offices, to encourage citizens to patronize the Independent system.

NEBRASKA ANTI-PASS LAW RESPONSIBLE FOR REMOVAL OF COURT HOUSE TELEPHONES.

BELL telephones which were installed some months ago in the county offices of Tecumseh, Neb., for use without charge are to be removed. These instruments were placed before the legislature, at its recent session, had passed a bill which makes it unlawful for a corporation to give its service to an individual without receiving compensation. A few days ago the manager of the telephone company notified the various officers that they would either have to pay for the telephones or permit them to be removed. As the county will not stand for the expense of all the instruments which were placed for the convenience of its officers, and as the officers themselves do not propose to pay for this service, the Bell company will be obliged to take out the instruments.

ROONEY'S OFF DAY.

DIVERSE are the tribulations of the troubleman and fluent is his tongue in the use of strong words, yet troubleman Rooney of Cleveland, accustomed as he is to complications and vexations and alarms and versed as he is in the possibilities of language, was left flabbergasted and speechless when he covered a trouble call from Rafferty's, Ontario street.



Now Rafferty runs a zoological garden where bottled beer is but five cents and an orchestra makes vivacious music in a pavilion hanging from the ceiling, and birds and beasts are there to amuse the guests.

Rooney had been there often and was pleased with the assignment. He unscrewed the mouthpiece of the transmitter and tapped the side of the telephone and said "Hello" to himself several times in rapid succession, as troublemen do. He opened the bell box and screwed and unscrewed without helping matters. Then he hit the trail of the interior wire and followed it to a hole in the floor. He stopped to examine the insulation.

"Ouch," or worse, said Rooney. A small hairy paw had entangled itself in Rooney's auburn curls. Rooney wasn't frightened a bit. He surmised that an ape had seized him and by beating wildly about his head with his pliers he saved his scalp.

"Bad luck to the likes of ye," muttered Rooney, rubbing his pate and shaking his fist at the ape perched above. I'll let yez off this toime fur the sake o' Darwin, but just bear it in mind that I'll take no more of yer monkey shines, ye little divil."

Then Rooney descended into the basement—familiar ground. "Sure an' its a blamed good thing stuffed bears can't scrap," he reflected. There is a huge stuffed bear in the Rafferty basement, as Rooney knew. Stretching himself to the limit, Rooney began a digital examination of the wire where it came through the floor above.

"Bloody murther," howled Rooney, as two hairy arms grasped him around the waist, pressing him strenuously to a furry bosom. Two barkeeps and the little man that feeds the animals heard Rooney's shouts and rushed down to the rescue. Fifteen minutes later, after restoratives had been applied, Rooney reported to the wire chief.

"It's canned I may be fur all I know," said Rooney, "fur I haven't fixed thot trouble at Rafferty's, and phwat's more, divil the bit o' it I'm intindin' to fix. It's not afeard of apes nor snakes, nor even bears whin they're alive, but I draw the loine at being squazed to death by a stuffed bear phwat ain't got no license to scrap, bad cess to him."

The two barkeeps and the little man that feeds the animals hadn't seemed to think it necessary to explain to Rooney that the basement contained, besides the stuffed bear, a very much alive little brown bear, recently presented to Rafferty by admiring friends, and chained in the cellar.

TENNESSEE COUNTY OFFICIALS CUT DOWN TELEPHONE POLES.

AFTER repeatedly asking the Cumberland Telephone & Telegraph Company to move its poles in the right-of-way of the public road near Dresden, Tenn., County Road Commissioners R. B. Freeman and Grizzard Gardner took a crew of men out and sawed down fifteen long poles on the main east and west line of the Cumberland near that town. For several years the Cumberland officials had been having trouble with farmers and the county authorities regarding the lines along the public roads, and no settlement had been effected when the poles were cut. A few weeks ago the county court issued bonds and provided for the grading and improvement of the public roads. In the resurvey of the roadway it was found that the Cumberland's poles were in the middle of the right-of-way. The company was notified to move them, but sent back the reply that any one molesting the poles or wires would be prosecuted. The road commissioners then acted as they thought best, and destroyed nearly a mile of the lines by cutting all poles and rolling up the wires.

The company's engineers and other officers are now in Dresden trying to get the grand jury to indict the commissioners, but so far no indictment has been rendered.

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FOR SALE—Second-hand 4-pin and 6-pin cross-arm, as follows, prices quoted being F. O. B. St. Louis:
922 six-pin cross-arms, pinned and painted, not braced, at 25 cents each.
819 four-pin cross-arms, pinned, braced and painted, at 20 cents each.
546 four-pin cross-arms, painted, not pinned nor braced, 10 cents each.
552 four-pin cross-arms, pinned and painted, but not braced, 12 cents each.
Address the Supply Department, Bell Telephone Company of Missouri, St. Louis, Mo. 899

FOR SALE—Visual signal, common battery, P. B. X. board; 120 lines, 24 volts, with 5 plug end trunks. In good condition; exceptionally low priced. Address Box 888, care of AMERICAN TELEPHONE JOURNAL, 100 William Street, New York. 888

FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—First class, central energy combination troubleman; married man preferred. Permanent position to right person. Address, Box 897, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 897

WANTED—Position by a young man as manager of exchange. Have had seven years' practical experience in construction work, both with Bell and Independent companies. Can give best of references. Address, Box 900, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 900

WANTED---Continued

WANTED—Position with telephone company east or central west. Fifteen years' experience as general foreman of construction and maintenance of lines. Address, Box 901, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 901

WANTED—Position in Engineering Department by experienced man familiar with modern methods in exchange cable and pole line construction. Best of references. Address Box 904, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 904

WANTED—Position with telephone company as superintendent or manager by married man; 10 years' experience in telephone work. Good on instruments, switchboard and construction. Desires to make change. Good reference. Address Box 865, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 865

WANTED—Permanent position by expert cableman. Expert in splicing and handling cables of all kinds, locating cable trouble with instruments and in cable construction and maintenance. Capable superintendent of construction and maintenance of wire plant or exchange equipment. Good Bell and Independent references. Address Box 893, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 893

CABLE SPLICERS furnished, familiar with both telephone and electric, all with at least five years' experience. Address Box 895, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 895

WANTED—Position by competent telephone engineer; prefer equipment or construction superintendent or like work. Magneto, central-energy, manual, automatic. Technical, practical, energetic. Best of references. Address Box 896, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 896

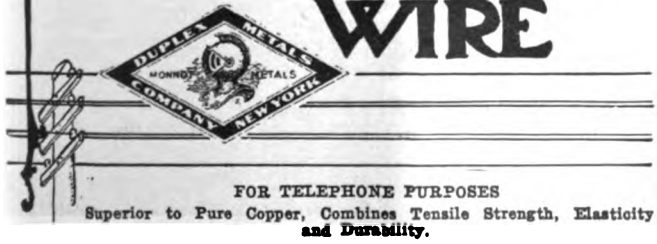
WANTED—Position as superintendent or foreman of repairs or construction. Twenty-five years' experience with Bell and Independent companies. Best references; good reasons for changing from present position. Address Box 883, care AMERICAN TELEPHONE JOURNAL, New York. 883

OFFERS.

OFFERS addressed to the undersigned will be received up to noon on Monday, the 16th day of September, 1907, for the furnishing of such telephone equipment and construction material as will be required from time to time in country exchanges to be built in the Province of Manitoba.

Detailed information including specifications may be had upon application. J. H. Howden, Minister of Railways, Telephones and Telegraphs, Winnipeg, Manitoba, Canada. 903

MONNOT COPPER-CLAD WIRE COSTS LESS AND IS SUPERIOR



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Superior to Pure Copper, Combines Tensile Strength, Elasticity and Durability.

to Pure Copper Wire, as it affords the non-oxidizable, acid-proof qualities of copper—combined with the tensile strength and high elastic limit of steel. This is

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Reasons—Data—Methods

ADVANTAGES OF UNDERGROUND CONSTRUCTION.—(904.)

We have a magneto system of 1,700 subscribers and cover the business portion of our city with aerial cable leads. We have recently been requested by the city to place this cable underground which would mean a large expense to us. Will you kindly give us a summary of the advantages and disadvantages of underground cable leads and your advice as to whether the additional expense which would be caused by placing these cables underground, would repay us in the long run. A. B. M.

There is no doubt but that the placing of your cables underground will repay you in the long run. As to how long that run would be depends a great deal on circumstances. If Boreas has in store for you a severe storm in the near future, you would get your money back very soon.

On new construction it is usually estimated that underground cables begin to pay dividends after three years. That is, the saving on maintenance for three years will offset the difference in cost of installation. These figures will vary somewhat, however, depending on local conditions.

As you now have your aerial construction in place, there is no doubt but that it would require several years' time before you would get any returns on your investment in conduit construction. That is dependent, however, on the present condition of your aerial construction and local conditions.

There are some points of advantage in underground construction which allow of no argument against them. A much more efficient service is secured with a minimum of interruptions, and this tends to create a feeling of genuine satisfaction among your patrons which will cause them to unconsciously work for your interests.

This harmony between the subscribers and the operating company is a very valuable asset, as you probably know. Another feature is that by removing your poles and wires from the streets you are in a measure a public benefactor, in that you are materially assisting in the beautification of your city, a fact that will be appreciated by the majority of your fellow citizens.

COIL WINDING DATA.—(905.)

For some time past I have been experimenting on a simplex proposition, but do not seem to be able to secure impedance coils built in the way I want them without paying several prices more than they are worth. The manufacturers state the work is "special," and is therefore worth more. If you can give me some data that will enable me to determine the size spools to use to secure a coil of a certain number of turns, and at a certain resistance, I will be indeed grateful. I have looked through all the standard works, thinking I might find a table of some sort giving this information, but have been unable to find anything of help to me.

Trusting that you will not think I am imposing on your good nature too much in coming to you so often for information, I am sincerely yours, H. D. K., Kan.

Your question is one which we have expected for some time as we know of no recent work in the electrical field containing just the information you desire, so we are prepared for you. We believe that you will find just what you want in Table 905, and would suggest that you clip it out and paste in a convenient part of your scrap book.

PROTECTION FOR TELEPHONE WIRES PASSING UNDERGROUND BENEATH 33,000 VOLT LINE.—(906.)

Our company's lines cross a high tension line carrying 33,000 volts overhead, and we desire to change them to an underground crossing. We intend to use No. 16 rubber covered twisted pair drop wire strung through a gas pipe. Will it be necessary to place lightning arresters at each end of the gas pipe to protect the wires passing through the pipe? The crossing will be about 100 yards from the exchange, where all lines are well protected. E. A. T.

A description of an underground crossing for permitting telephone wires to pass safely beneath a 33,000 volt line was published upon page 171 of AMERICAN TELEPHONE JOURNAL, issue of March 17, 1906. The diagram published with this article shows the telephone line wires connected to No. 14 twisted pair rubber covered wire which was cabled up and led through an iron pipe laid in the ground below the frost line. The point is brought up in this article that when such a crossing is remote from the exchange lightning arresters would be better be omitted, as it is preferable to risk losing a section of a pair of wires worth a small sum than to risk the expense of having to send out men to fix up lightning arresters every time there is a heavy storm.

This, however, would not apply to your case as your crossing is so near the exchange. Under the circumstances you will probably find that if lightning gets on your lines an iron pipe will tend to choke back the discharge, and we would suggest that you install a carbon spark gap arrester upon each line at each end of the pipe, or else run the wires through an insulated conduit of some standard type, if you can make it waterproof. It is hardly necessary to suggest that once your crossing is installed you don't have to figure on protection from the 33,000 volt line as the crossing itself is supposed to be sufficient to secure safety in this respect. All you have to look out for is protection from lightning and sources of high potential other than the 33,000 volt line at the crossing.

To sum up the whole situation, we should advise you in the present case to run your twisted pair rubber covered wires through an iron pipe and install a spark gap arrester without fuses on each line at each end of the pipe, or else to install a waterproof insulated conduit and omit lightning arresters. Use the most economical and convenient method.

No. B.&S.	Diameter in Mils Over Insulation. S. C.	D. C.	S. S.	D. S.	Turns Per Linear Inch. S. C.	D. C.	S. S.	D. S.	Turns Per Square Inch. S. C.	D. C.	S. S.	D. S.	Ohms Per Cubic Inch. S. C.	D. C.	S. S.
20	37.861	42.161	34.261	36.161	25.7	22.5	27.70	26.22	660.5	506.3	767.3	687.5	.646	.533	.801
21	34.362	38.662	30.762	32.662	28.3	24.5	30.97	29.07	800.9	600.2	959.1	845.0	.981	.795	1.261
22	31.247	35.547	27.647	29.547	31.0	26.7	34.39	32.11	961.0	712.9	1182.7	1031.0	1.502	1.188	1.958
23	28.471	32.771	24.871	26.771	34.4	28.97	38.19	35.53	1183.0	839.2	1458.5	1262.4	2.359	1.772	3.049
24	26.000	30.300	22.401	24.300	36.9	31.35	42.37	39.14	1321.6	982.8	1795.2	1532.0	3.528	2.595	4.739
25	23.800	28.100	20.200	22.100	38.0	33.92	47.02	42.94	1444.0	1150.8	2210.9	1843.8	5.831	3.802	7.489
26	21.840	26.140	18.240	20.140	42.0	36.29	52.06	46.81	1764.0	1317.0	2710.3	2191.2	6.941	5.552	9.031
27	20.095	24.395	16.495	18.395	48.0	38.95	57.67	51.59	2304.0	1517.2	3326.0	2661.6	10.814	8.078	13.82
28	18.541	22.841	14.941	16.841	53.0	41.61	63.36	56.43	2809.0	1731.0	4014.5	3184.5	17.617	11.54	26.86
29	17.157	21.457	13.557	15.457	56.5	44.27	70.11	61.56	3192.3	1959.9	4915.5	3789.8	25.500	16.47	41.29
30	15.925	20.225	12.325	14.225	59.66	46.93	77.14	66.79	3559.2	2202.5	5950.2	4461.0	34.800	23.43	62.98
31	14.828	19.128	11.228	13.128	64.125	49.78	84.64	72.39	4112.2	2478.0	7164.0	5240.0	48.5	32.83	95.70
32	13.850	18.150	10.250	12.150	68.600	52.34	92.72	78.19	4692.5	2739.5	8597.5	6114.0	73.8	46.19	144.70
33	12.980	17.280	9.380	11.280	73.050	55.10	101.65	84.17	5333.5	3036.1	10332.0	7085.0	104.5	64.30	217.8
34	12.204	16.504	8.504	10.504	77.900	57.57	112.11	90.44	6068.5	3314.2	12570.0	8179.5	151.4	70.58	342.1
35	11.514	15.814	7.914	9.814	82.600	60.04	119.70	96.90	6777.3	3605.0	14328.0	9389.5	202.0	125.9	489.0
36	10.900	15.200	7.300	9.200	87.100	62.51	130.15	103.55	7586.5	3907.5	16940.0	10722.0	298.8	166.3	721.1
37	10.353	14.653	6.753	8.653	91.870	64.70	140.60	110.20	8440.0	4186.1	19770.0	12145.0	418.0	225.6	1062.0
38	9.865	14.165	6.265	8.165	95.000	66.80	151.05	116.85	9025.0	4462.2	22820.0	13655.0	567.0	305.5	1557.0
39	9.431	13.731	5.831	7.731	100.700	68.80	163.04	122.55	10140.5	4733.6	26700.0	15018.0	811.0	409.8	2266.0
40	9.044	13.344	5.344	7.344	106.000	71.20	177.65	129.20	11236.0	5069.8	31559.0	16692.0	1113.0	545.5	3400.0

DIAMETER AND AREA OF COIL END AND CORE.

1/16	.00307	9/16	.24850	1 1/16	.8866	1 9/16	1.9175	2 1/16	3.3410	2 9/16	5.1572
1/8	.01227	5/8	.30680	1 1/8	.9940	1 5/8	2.0739	2 1/8	3.5466	2 5/8	5.4119
3/16	.02761	11/16	.37122	1 3/16	1.1075	1 11/16	2.2365	2 3/16	3.7583	2 11/16	5.6727
1/4	.04909	3/4	.44179	1 1/4	1.2272	1 3/4	2.4053	2 1/4	3.9761	2 3/4	5.9396
5/16	.07670	13/16	.51849	1 5/16	1.3530	1 13/16	2.5802	2 5/16	4.2000	2 13/16	6.2126
3/8	.11045	7/8	.60132	1 3/8	1.4849	1 7/8	2.7612	2 3/8	4.4301	2 7/8	6.4918
7/16	.15033	15/16	.69029	1 7/16	1.6230	1 15/16	2.9483	2 7/16	4.6664	2 15/16	6.7771
1/2	.19635	1.	.7854	1 1/2	1.7671	2.	3.1416	2 1/2	4.9087	3.	7.0686

Table 905.

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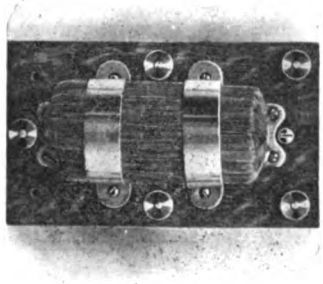
Our Duplex Transformer—A Money-Maker for You

Do you realize that in using our duplex transformers on a metallic and reasonably balanced toll line, you can double the earning capacity of your line?

For instance, place a duplex transformer at each end of the line and balance branches by placing non-inductive resistance on one branch, and you have an additional single circuit.

This circuit can be used by operators for the arranging of next connection, either by telephone or telegraph set, while conversation goes on uninterrupted on natural line, or, you may rent the circuit to a broker for private use.



If two metallic lines are running parallel, an additional metallic circuit can be obtained, which is in every respect equal to the two natural circuits.

The ratio between windings in our coils is such that the transformation is equally efficient for both ringing and talking.

Look at this as an investment—you have absolutely no extra line building or maintenance.

By merely installing our duplex transformers you have an entirely new circuit. These transformers pay for themselves in a week, and they cost you less than 1-4 the price of installing a mile of line.

You must necessarily have perfectly made and balanced coils in order that the phantom as well as the natural lines will be free from noise and cross talk.

We have made these transformers for over twelve years and guarantee them on clear lines.

It's all in the "Ericsson Workmanship."

Catalogue gladly sent—you need one.

L. M. ERICSSON TEL. MFG. CO.
BUFFALO, N.Y.

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With the Inventors

CABLE HANGER.

C. L. Peirce, Jr., Chicago, patent 856,099, June 4, 1907, assigned to W. G. Nagel Electric Co., Toledo, Ohio.

The cable hanger here described consists of two pieces, one being a flexible strap-like member of any required length which is stamped from some light sheet metal, pressed fibre, leather or other suitable material and is provided toward one end with an expanded slit, the width of which at the centre is sufficient to permit the opposite end of the strap to pass freely through when encircling the cable.

The second piece consists of an inverted "U" shaped piece of stamped sheet metal to hang from the messenger. It is formed with outwardly pressed tongues near its terminals. The first piece is extended down, up, and around the cable, the opposite end passed through the slit and pulled tightly outward, after which the strap is hung on to the outwardly pressed tongues of the "U" shaped metal piece by means of holes provided in the ends of the strap.

STEP-BY-STEP SELECTIVE SYSTEM.

A. J. Farmer, Detroit, Mich., patent 860,860, July 23, 1907.

This system comprises a step-by-step selective means for connecting the talking and ringing circuit of the desired instrument with the line wires. A wheel bears contact points which pass over a series of contact springs when the wheel is turned. The turning of the wheel is accomplished by an engaging pawl attached to the armature of an electromagnet through which impulses of current are sent by a controlling device located at the central office.

SWITCHBOARD APPARATUS.

H. P. Clausen, Chicago, patent 861,809, July 30, 1907; assigned to A. E. T. Co.

This patent relates to the connection of a suitable impedance coil in the cord circuit of a common battery system to reduce the noise in the receiver of a calling subscriber when the operator is making the "busy" test in the multiple jack of a desired line. This is accomplished by bridging the coil around the normally closed inner contacts in the tip side of the listening key. When the key is operated to make a busy test it removes the short circuit from the impedance coil, which thus enters into the connection between the tips of answering and calling plugs.

CABLE HANGER.

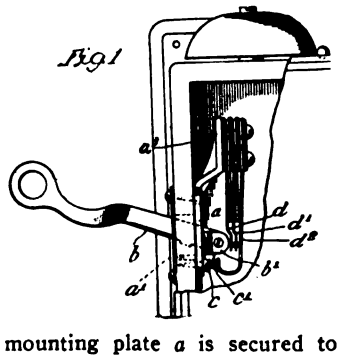
R. S. Peirce, Chicago, patent 861,887, July 30, 1907.

In order to do away with the device of knotting marlin to a hook in a cable hanger, the inventor clamps the two ends of a piece of marlin into a zinc tube, which is given a suitable form to hang over a messenger stand.

HOOK SWITCH.

E. B. Craft, Chicago, patent 862,449, Aug. 6, 1907, assigned to W. E. Co.

This hook switch comprises a mounting plate *a*, which supports upon its rear edge a pivoted lever *b* and switch springs



d, d^1, d^2. The mounting plate *a* is secured to the inner wall of the telephone case instead of being on a shelf. The downward movement of the hook is governed by the metal bushing a^1, while the upward swing is limited by the lug c^1.

TELEPHONE SYSTEM.

C. S. Winston, Chicago, patent 861,340, July 30, 1907, assigned to K. S. & S. Co.

In this common battery system the non-inductive resistance 9 is placed in parallel with the supervisory system

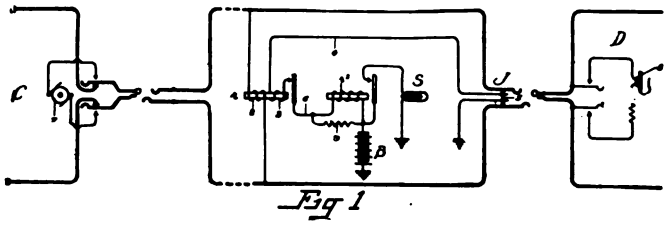


Fig 1

locking-relay r^2. This allows the kick of the extra or induced current in the magnetic windings of the relay to be short circuited. Being "shorted" it will be absorbed in this non-inductive shunt and will not affect other apparatus in the circuit. The inventor claims that this assures, at all times, the positive operation of the relay armatures and the supervisory lamp *s*.

JUNCTION BOX.

F. B. Cook, Chicago, patent 861,813, July 30, 1907.

This patent covers a junction box having a cylindrical sheet metal cover supported upon a sheet metal base attached to a bracket arranged for attachment to a pole. Nozzles leading into the bottom of the box are provided for the entrance of cable. Interior arrangements of the box may be provided to fit it either for use as protection for a cable terminal or for a spliced connection between cable conductors.

TELEPHONE SYSTEM.

W. W. Dean, Chicago, patent 862,616, Aug. 6, 1907; assigned to K. S. & S. Co.

Each of the windings of a balanced differential supervisory relay is connected into one strand of a two-wire cord circuit, having battery connected to the line strands through the windings of a repeating coil. When a cut-off relay, bridged across terminals of the jacks in the line circuit, is operated by battery flowing through the cord strands, if the line relay is not also operated by a flow of current through the closed contacts at the subscriber's hook switch, one side of the line will be grounded through a special circuit leading through contacts of the cut-off relay, a back contact of the line relay armature and a resistance to ground. This causes an excessive current to flow through one winding of the differential relay, unbalancing it and causing it to draw up its armature and light the supervisory lamp. When the subscriber's telephone is off the hook the special circuit is broken at the back contact of the line relay, and the supervisory relay takes its normal position, putting out the lamp.

ELECTRO-THERMAL SWITCH.

J. G. Nolan, Chicago, patent 861,310, July 30, 1907; assigned to F. B. Cook.

A heat producing element, such as a heat coil, is placed in close proximity to the inner wall of a chamber containing a fluid adapted to expand under the influence of a moderate amount of heat. The metal diaphragm retaining the outer surface of the expansible material is normally concave, but when the fluid expands it is forced outward, carrying with it a flexible spring which effects desired changes in associated switch contacts.

This provides a protective device, which, by varying the design of the heat producing element and the nature and amount of expansible material, can be arranged to operate within definite lines covering a considerable range.

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COMMERCIAL

¼ MILLION DOLLARS ADVANCE

Our 1907 business will exceed 1906 by the above amount. What does that prove to you?

It assures us that our efforts to please the Telephone Trade are appreciated; that one trial order gets us a new customer. Get in the band wagon and follow the crowd.

Everything for Telephone Line Construction

Commercial Electrical Supply Co.

15th STREET, ST. LOUIS, MO.

COMMERCIAL

卐

IS IT GOOD LUCK?

No, it is not "luck" which has built up our business, although some competitors call us "lucky." It has been twelve hard years of systematic and conscientious effort in developing our apparatus through successful stages to the present high state of efficiency. "Luck" has absolutely no place in our factory, for every step in the making of our apparatus is systematized, every possible test made, and perfect goods sent our trade. So that though they may believe in the "Swastika" or "Good Luck" sign, we know the reason for their good service, their abundant dividends and general prosperity.

May we bring you "Good Luck" now through the use of our telephone apparatus? Write our nearest office your requirements today.

Central Telephone & Electric Company

Makers of High-Grade Telephone Apparatus. Dealers in Telephone Supplies (Exclusively)

Main Office and Factory:
2131-37 LUCAS AVE., ST. LOUIS, MO.

120 Liberty Street, New York City
237 Commerce St., Dallas, Texas

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With the Inventors

FUSE.

R. S. Peirce, Hinsdale, Ill., patent 861,315, July 30, 1907; assigned to Peirce Specialty Co., Chicago.

A non-conducting tube has a perforated cap fastened to each end. A strip of fuse wire is placed in the tube and leading in wires put through the cap at each end until they are beside and in contact with the end portions of the fuse wire. A drop of solder serves to fasten the fuse wire, leading in wire, and cap together, also closing the tube.

When a fuse has blown the leading in wires may be loosened and withdrawn to permit of the insertion of a new strip of fusible metal, after which the apparatus is arranged for use as before, thus doing away with the waste of tube and caps.

LIGHTNING ARRESTER SWITCH.

W. D. Shirk, Fairfield, Iowa, patent 860,157, July 16, 1907.

Mounted on an insulating base is a long central carbon which may be connected to ground. At each end of this is a pair of carbons, with separating dielectrics, forming in connection with the long carbon a lightning arrester of a common type. Clips which hold one pair in place are connected to the instrument, while those at the other end are dead. These clips are connected to jaws adapted to be engaged by the blades of a d. p. d. t. switch, these being connected to the line. Normally the switch is to be thrown to the instrument, but during a lightning storm it may be thrown over to the dead side, cutting out the telephone but still leaving the line protected.

CABLE TERMINAL.

F. B. Cook, Chicago, patent 861,812, July 30, 1907.

Two similar porcelain halves are fastened together to form an inclosure for cable conductors. Hollow bolts passing through the porcelain may have cable conductors inserted in them and soldered at the outer end, thus incidentally closing the tubes. The two halves may then be clamped together and the interior of the terminal filled with insulating compound through an opening at the top, making a moisture proof joint. Aerial conductors may be run through fanning strips attached to each section of porcelain, and clamped between nuts threaded on the outer ends of the bolts. A sheet metal cover encloses the whole terminal.

FAULT LOCATING DEVICE.

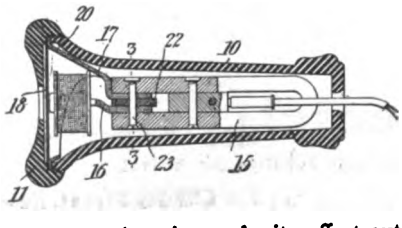
G. G. Buttler, Oklahoma, O. T., patent 861,357, July 30, 1907; one-half assigned to A. D. Marble, Oklahoma.

This device comprises the combination of a generator, a ringer, an induction coil, transmitter, a battery, four double throw switches and the necessary wire connections and a series of jacks all mounted in a suitable carrying case. The apparatus is so wired that by attaching the terminals of his test cord to the line wires and operating the keys in the manner described while turning the generator crank the trouble man may be aided in determining the nature of a trouble on the line.

TELEPHONE RECEIVER.

W. R. Bankhead, Bremerton, Wash., patent 863,253, Aug. 13, 1907.

In this receiver one pole of the horseshoe magnet 15 is attached to the soft iron core 16 of the electromagnet coil and the other



to the diaphragm supporting ring 20 by its offset extension 17.

The object of the inventor in so constructing the receiver is to make one of a bipolar type in which one pole is brought into very close proximity to the other, the two being separated only by a minute air gap, and one in which the diaphragm forms a part of the magnetic circuit.

A greater sensitiveness and a peculiar adaptability to the reception of wireless transmission of messages are claimed for this receiver by the inventor.

TELEPHONE REPEATER CIRCUIT.

H. E. Shreeve, Newton, Mass., patent 863,230, Aug. 13, 1907, and assigned to A. T. & T. Co.

This patent covers a form of telephone repeating circuit in which transformer coils M^8 are connected serially in the line. In the local circuits of these transformers is connected a reinforcing

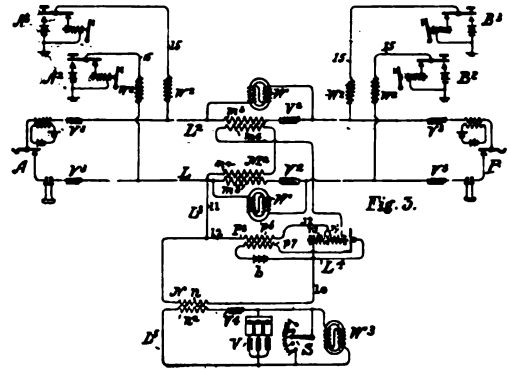


Fig. 5.

relay transmitter r^3 which is in series with a transformer N. In the circuit L^8 in which is included the secondary winding n^3 of this transformer are variable means for altering the resistance and capacity of the circuit, thus producing an artificial line which, when it has a reactance to the reinforcing current equal to that of the main line, causes an equal potential to be maintained at opposite extremeties of the bridge 12, thus preventing singing of the apparatus.

The object is to provide a repeater which is adapted for connection to a long distance line at a point unequally distant from both ends.

COIN COLLECTING APPARATUS.

J. W. Lattig and C. L. Goodrum, patent 859,775, July 9, 1907; assigned to Dean Electric Company.

This patent covers a form of pay station in which coins to the proper amount are deposited in slots after the operator has been informed of the number of the line desired. If the person desired answers, the operator releases an electrical locking device and the coins are then transferred to the coin receptacle by the subscriber's operating suitable push buttons, a feature of this operation being the striking of gongs which transmit a code signal to the operator at the central office. If the connection cannot be secured the calling subscriber replaces his receiver upon its hook and the coins deposited are automatically returned to him.

TRUNK SYSTEM.

W. W. Dean, patent 851,500, April 23, 1907; assigned to K. S. & S. Co., Chicago.

The trunk system described in this patent is provided with a relay having a high and low resistance winding. The high resistance winding being connected in the metallic circuit of the trunk line at the time that it is desired to operate the signal in the A cord circuit. It is so arranged as to be at other times removed from the circuit and a low resistance winding connected in place of the same, in such a manner that the supervisory relay connected in series with the low resistance winding will receive sufficient current to cause an actuation of its armature.

It further provides, so the inventor states, a means for receiving the busy click by the operator without disturbance to the subscribers.

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Regarding Long Distance Service

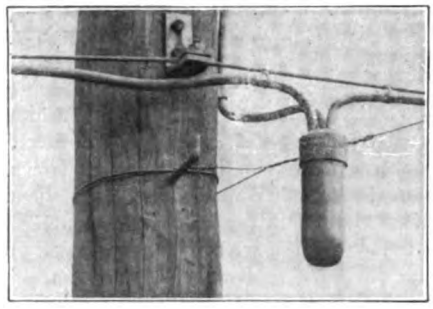
Read what a prominent daily newspaper says of

The Calculagraph

"Toll and long distance service, which each individual user employs only occasionally, is necessarily charged for by the single message. The only fair measure of the service of the costly long distance plant—costly to build, to maintain and to operate—is that of the length of time the line is used. Time being of all things the most precious in this age of hustle, it must be measured with absolute accuracy when it is made a commodity. It is the absolute mechanical precision with which this is done by the CALCULAGRAPH that makes the telephone one of the great commercial economies of the day."

Our Booklets Explain the Reasons
Write for Them To-day

CALCULAGRAPH COMPANY
1437 JEWELERS BLDG., NEW YORK CITY
Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.



A COMPLETED

Hargis Cable Splicing Joint

(Moisture-Proof)

differs only in appearance, the principle remains the same as the old style wiped joint. Its position in regard to the cable and messenger wire is practical. First, because the joint is on top, and therefore easier to inspect; and second, because when the splice is opened the conductors hang downwardly and are in a more accessible position. The pouring of the solder is very simple. There is no wiping necessary. In the old style Horizontal Wiped Joint both ends must be soldered and carefully wiped. This requires a knowledge and skill which many otherwise good cable men do not possess.

The position of the conductors is more practical for boiling out (simply immerse the exposed conductors in a pot of hot paraffin); it is more practical because of the greater ease in tagging the wires for conductor assignments and also for splicing.

The splicing of the individual pairs is identical with the old method, except that the paper sleeves are put on after the wires are spliced.

You will see from the above that any cable man is very well acquainted with the principles of this device. The difficult and objectional features of the Horizontal Joint are eliminated. Everything else remains the same, except the position of the Joint.

If you are considering new cable construction or changes in your cable plant, you should write us at once for information, prices, etc., on the Hargis Joint. They will save you time and money. You will improve your cable construction.

W. N. Matthews & Brother
Manufacturers of Patented Money Saving Specialties,
214 N. SECOND STREET ST. LOUIS
Branches: New York, San Francisco.

"Arrester"

"Leave not that to chance, which foresight might provide for or care prevent."

HE-IS-A-TOUGH CUSTOMER

But we have him safe!

WE will furnish the "Arrester,"
YOU furnish the "Good Ground."

REMEMBER! without "Good Ground" "Arrester" has no place to take him.

SUMTER TEL. MFG. CO., SUMTER, S. C.

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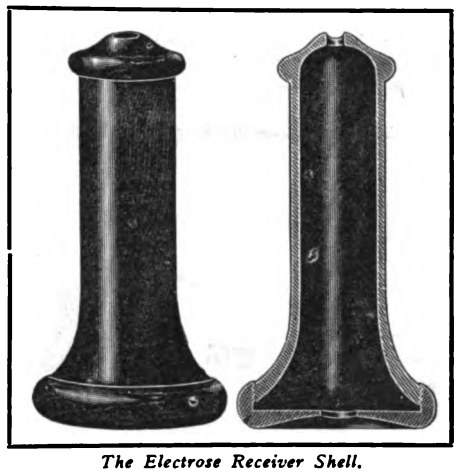
Manufactures and Sales

ELECTROSE RECEIVER SHELLS.

FRANK W. PARDEE, 52 Fifth avenue, Chicago, has been appointed General Sales Agent for the Electrose Mfg. Co. of Brooklyn, N. Y., in the territory between Buffalo and Denver on the East and West and between the Canadian line and the Gulf of Mexico on the North and South. The Electrose Mfg. Co. manufactures the well known Electrose products which are substitutes for hard rubber parts of all kinds. In telephone work it is used for receiver shells, mouth pieces and insulating material for general work. Receiver shells and mouth pieces are made for practically every type of receiver or transmitter.

Electrose insulation was first placed on the market 14 years ago, and reports to the effect that it has satisfactorily fulfilled all requirements through both weather and service tests ever since have been furnished. An examination of the mechanical properties of this substance shows that Electrose is hard, dense, tough and strong. It is said to possess the highest insulating qualities and be exceptionally durable; to be unaffected by moisture or changes of temperature, and not liable to shrink, warp or change its form. The manufacturers claim that it does not lose its color and always retains its high polish and lustre. It does not tarnish or discolor highly polished metals with which it may be in contact. It is especially adapted for insulating parts that require accuracy and permanency of dimensions.

Telephone companies have found Electrose receiver shells and mouth pieces particularly desirable on account of their economy and their strength. They do not break easily, and when they do break the cost of repairing them is very low. Mr. Pardee is very enthusiastic about these shells and offers to send samples and special quotations to any telephone company that is interested.



The Electrose Receiver Shell.

Electrose is manufactured only by the Electrose Mfg. Co., and is fully protected by trade marks in a number of countries in the world. The company has been obliged to increase its plant several times within the last few years and is now contemplating duplicating the entire present plant in order to keep up with the growth of its business.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY of Plainville, Conn., has recently published a new bulletin covering its Type "A" Switches, which shows a large extension to the line, and many changes and improvements are made. The bulletin covers 34 pages, and represents the most complete line of any one type of switches ever published.

Four-pole switches are listed, also new code fused switches with high fingers for fuses both on the hinge and handle end, and a complete line of switches for alternating current from 15 to 2,000 amperes. Features of its arrangement and illustration are especially commendable, making its a very satisfactory source of information concerning the products it describes.

The bulletin will be cheerfully sent upon request to all those interested.

STROMBERG-CARLSON TELEPHONE MFG. COMPANY, Rochester, N. Y., is issuing a leaflet giving information about jumper wire. The large amount of this material used in every exchange makes it important that only the best quality of material should be used, that it should have a satisfactory insulation, a durable covering, and that the braided covering shall be colored in a manner to make the two wires of a pair readily distinguishable.

The Stromberg-Carlson jumper wire is made up with an insulation consisting of two silk windings and one of cotton, laid in reverse directions, and covered with an outside braid. For the duplex wire slate and white are the colors chosen for the coverings. The individual wires of the triplex combination are covered with a braiding of steel, white and red, respectively. Quadruplex can be furnished on special orders. The company will be pleased to send full information on receipt of a request.

THE BUCKEYE ENGINE COMPANY, Salem, O., issues a neat card, which is now being distributed, offering several interesting reasons for the installing of an electric blue printing machine. Telephone companies which have a large amount of this work to do can obtain suggestions as to the cost of an outfit, and the time required for doing their own printing, by writing to the manufacturers of this machine.

THE F. BISSELL COMPANY, Toledo, O., in a small folder draws attention to some of the features which good cable pole houses should have, as being necessary for durability and to prevent the entrance of moisture. The leaflet is illustrated with views of two types of Security pole houses, which appear to be very firmly built, and to embody some first class points of design. The company will send these folders to managers and construction men upon receipt of a request.

THE LONG DISTANCE TELEPHONE MANUFACTURING COMPANY, South Bend, Ind., in a useful book entitled "Telephone Information" describes the advantages of telephone service to rural communities. It tells how to organize a small company, what points to consider in buying apparatus, building lines, etc. The book contains descriptions of the telephone apparatus manufactured by the Long Distance Company, and is illustrated by engravings which show many interesting points which are included in the design of the company's telephones, transmitters, ringers, etc.

W. N. MATTHEWS & BRO., 209 North Second street, St. Louis, Mo., in a striking folder which has just been issued, make the statement that although a dead man can be compared to a Stombaugh guy anchor as a safe form of anchorage, the latter has the great advantage that it can be put in in so much less time that it will earn a saving of over 19 per cent. on the cost of the cheapest dead man a company can install. An interesting graphical representation of the action of the Stombaugh guy anchor upon the earth under strain is shown. A copy of the folder, which includes a price list for different sizes of the anchor, will be furnished to interested persons upon receipt of a request.

S. B. CONDIT, JR. & COMPANY, Boston, Mass., publish some valuable information concerning their well known marlin cable hangers, which have been in extensive use among many telephone companies having rigid specifications for many years. The company states that in the manufacture of this appliance it uses only the best selected long fibre American hemp, treated with a high quality of Georgia tar. The result is a house line which will stand a tension of 300 lbs. when wrapped around a one inch bar.

The hooks used with this hanger are guaranteed to stand a strain of 100 lbs. without showing any signs of opening. They are made of No. 9 spring steel wire, and are hot galvanized after being formed. The galvanizing is guaranteed to stand the four-immersion sulphuric acid test. The company manufactures standard styles for ordinary sizes of cable, also special sizes.

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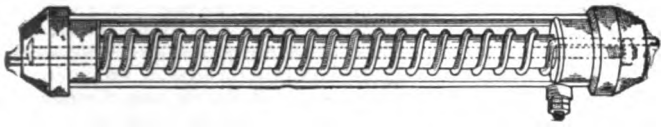
SKY ROCKET ARRESTERS

Necessary to the Perfect Operation of Any System



In the Sky Rocket Arrester a 50-inch length of wire is built up into a succession of coils around a porcelain tube thus having a choking or reactance effect, and is surrounded by an iron cylinder to which is attached the ground wire.

When current of excessive potential, such as lightning, strikes the line wire it will not travel over this succession of coils into the telephone or switchboard. Instead it chooses the shorter path to ground, which is obtained by leaping the minute air gap between the discharge points of the wire helix and the grounded iron cylinder.

Speaking of lightning protection, a well-known member of the American Institute of Electrical Engineers says:

"Perhaps a manager has decided that arresters are an unnecessary evil and has taken them all off his system. With good luck such a system may run several months without trouble from lightning, but each high potential surge which enters the central office will do a definite amount of irreparable damage to such insulation as is not self repairing. Sooner or later, enough strokes of high potential occur at one point to cause a puncture and all other points weakened by overstraining are very likely to give way.

"Arresters are of the nature of insurance. A reasonable percentage of the cost of the apparatus, cable lines, etc., with a factor of the cost of repair of each kept in view, should be added to the monetary value of continuity of service. The sum thus found should be the limit up to which it is justifiable to make expenditures for protection."

The cost of Sky Rocket Arresters is away below the sum that this engineer deems justifiable for protection and

THEY ALWAYS PROTECT

Write To-day for Sample

Chance Manufacturing Co.

Centralia Missouri

N. B.—The names of engineers quoted in this series of advertisements will be given on application.

Easophones
The WIRE & TELEPHONE COMPANY of AMERICA
ROME, N.Y.

"Sorry, but I must ring off."

"What's that?"

"Yes, when you called me last week I was home and was talking over an Easophone. With it I was comfortably seated in an armchair and could talk without tiring myself. Here, at my old-fashioned spinster Aunt's house, there is nothing but the old type, and I must either hold the heavy stand or lean over to it. You know what a comfort the Easophone is in your office. Call me to-morrow; the company promised my Aunt to have them in here by that time."

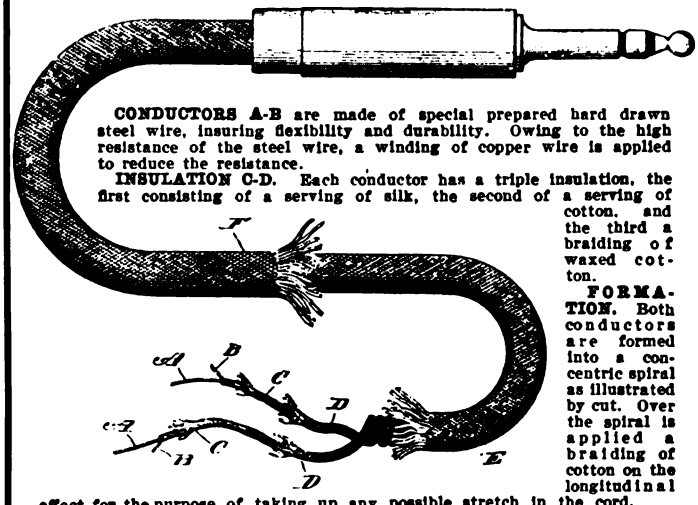
Smile! What! With **this** phone? **NO** I cannot forget my **Easophone**

See adv. August 17th and 31st, and write for Bulletins Nos. 101 and 102.

The Wiro & Telephone Company of America

ROME, N. Y.

Promior BB Stool Cord



CONDUCTORS A-B are made of special prepared hard drawn steel wire, insuring flexibility and durability. Owing to the high resistance of the steel wire, a winding of copper wire is applied to reduce the resistance.

INSULATION C-D. Each conductor has a triple insulation, the first consisting of a serving of silk, the second of a serving of cotton, and the third a braiding of waxed cotton.

FORMATION. Both conductors are formed into a concentric spiral as illustrated by cut. Over the spiral is applied a braiding of cotton on the longitudinal effect for the purpose of taking up any possible stretch in the cord.

RE-ENFORCEMENT SPRING made of very high grade steel wire is inserted in the hollow of the cord at PLUG END for the purpose of doubly re-enforcing the cord at the end that is subject to the greatest usage. The spring is inserted in a manner that prevents the conductors from being thrown out of alignment, making it almost impossible to break the cord at the PLUG END—regardless of how the operator may insert or jam it into the switchboard jacks.

OVERALL BRAID E-F. Consists of special high-graded linen thread boiled in wax. A double braiding is applied at the plug end for the re-enforcement.

Let us quote you our new prices
They're in your favor

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton St., Chicago

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Non-Technical News Items

NEW COMPANIES.

MAMMOTH SPRINGS, ARK.—The Home Telephone Company has been incorporated by W. N. Wicks, Martin Peters, H. J. Rowe and others for the purpose of building a telephone system to connect West Plaines, Mammoth Springs and other cities of this locality.

PERRY, ARK.—The Choctaw Telephone Company has been incorporated with a capital stock of $5,000 and the following officers elected: President, M. M. Spencer; vice-president, John S. Harris; secretary-treasurer, S. H. Spencer.

BETHEL, ME.—The Mount Abram Telephone and Telegraph Company has been incorporated with a capital stock of $2,000 and the following officers elected: President, Joseph F. Harrington, Greenwood; treasurer, W. C. Cross, Greenwood. Directors, W. A. Holt, Greenwood; F. L. Edwards, Bethel, and G. E. Grover, of Albany.

WINTHROP, ME.—The Winthrop and Readfield Telephone Company has been organized at Augusta for the purpose of doing a telephone business in Kennebec and Androscoggin counties. Capital stock, $10,000. The following officers have been elected: President and treasurer, E. M. Leavitt, of Winthrop.

COLUMBUS, MISS.—An effort is being made by N. D. Smith, who has recently installed Independent telephone systems at Jackson, Tenn.; Meridian and Hattiesburg, to interest the citizens of this city in establishing a system here. Mr. Smith states that if he can secure the necessary help he will begin work within thirty days and have the exchange in operation by January first.

VAN ETTEN, N. Y.—The Van Etten Telephone Company has been incorporated with a capital stock of $5,000 by Dr. J. W. Gee, George Banfield, B. U. Osborne, of Van Etten.

KNOX, N. D.—The North Knox Telephone Company has been incorporated with a capital stock of $6,500 by C. J. Markstad, and Martin Steen, Knox; and James Kane, Lisbon.

NEW ROCKFORD, N. D.—The Air Line Telephone Company has been incorporated to operate a system of telephones in this city by A. J. Ritcher, J. P. Knoack and J. A. Paulson.

NORWOOD, OHIO.—The Fitzsimmons Telephone Company has been incorporated with a capital stock of $5,000 by E. Heeb, James J. Mullaney, Harry Burckhardt, Charles Baker, and Ferdinand A. Basson. This company has already secured franchises and permissions to install telephone systems in Norwood, Silverton, Pleasant Ridge and Madisonville.

SWANTON, OHIO.—The Swanton Home Telephone Company has been incorporated with a capital stock of $20,000 by Mathias Lochbihler, M. J. Linehan and L. M. Lathrop.

NEWALLA, OKLA.—The Farmers' Independent Telephone Company, of Stella, has been incorporated with a capital stock of $100. The incorporators are L. S. Wheeler, Jos. Church, J. L. Mayes, J. A. Herring, all of Stella, and A. V. Hulse, Newalla, and T. J. Whittenden, of McLoud.

NEW CASTLE, PA.—The International Engineering and Construction Company has been incorporated with a capital stock of $25,000. The object of this company is to promote and construct telephone and telegraph lines and systems.

DINWIDDIE, VA.—The citizens of this city have recently met and discussed the feasibility of organizing an Independent telephone company. The proposition was discussed and endorsed and subscriptions for stock were taken. A meeting will be held at an early date to perfect the organization. Address communications to Dr. E. C. Powell, who is at present presiding.

CURTISS, WIS.—The Curtiss and Withee Telephone Company has been incorporated with a capital stock of $900. The incorporators are Theodore X. Johnson, William Peterson and J. S. Jacobson.

NELSON, B. C., CAN.—At a recent meeting of the Board of Trade a resolution, endorsed by Mayor Gillett, was introduced, that owing to the present inadequacy of the telephone service a committee be appointed with the end in view of considering public ownership of telephones.

FRANCHISES.

POCATELLO, IDAHO.—The Utah Independent Telephone Company of Salt Lake City, Utah, has applied for a franchise to operate a system of telephones in this city. This company is making similar applications in other cities in this district and expects to form, in conjunction with the Montana Independent Telephone Company, a comprehensive network of telephones lines that will ably care for all the telephone business in the territory.

ALEDO, ILL.—The People's Telephone Company, which was organized at this place with a capitalization of $3,500, will apply to the town council for a franchise and permission of setting poles, running wires, etc., in the city of Aledo.

MARSEILLES, ILL.—The Ottawa Home Telephone Company of Ottawa, Ill., has applied for a telephone franchise in this city. The citizens of Marseilles and the farmers in the vicinity are very favorably disposed to the granting of this, as it will give them an opportunity to secure connections with the adjoining towns and cities. This they are unable to do at present.

CARLISLE, KY.—The Carlisle Company had applied to the Carlisle City Council for the sale of a telephone franchise. This company has been operating for some years on a permit granted by the city council, but a franchise was never sold. The company contemplates numerous extensions and improvements in its system, but does not care to make the expenditure while operating under a defective franchise.

OWENSBORO, KY.—This city is advertising for sale a franchise for the constructing, acquiring and operating of telephone exchanges and systems and apparatus for transmission of electricity, electric energy, sound and intelligence within the city of Owensboro for a term of twenty years.

CARSON CITY, NEV.—The Utah Independent Telephone Company of Salt Lake City, Utah, has applied for a telephone franchise in this city and county.

HURON, PA.—The Erie County Mutual Telephone Company of Erie has filed application in the probate court of Erie County at Sandusky for franchise rights within the corporate limits of Huron. The Erie Company contemplates commencing work just as soon as the franchise is granted, and expects to have a telephone system installed and working before winter.

ROCK HILL, S. C.—The Rock Hill Telephone Company recently applied to the city council for a twenty-five-year franchise and the matter was referred to a committee. This committee has returned a favorable report on the application and instructions have been given for the drafting of a suitable franchise.

EL PASO, TEX.—At the last meeting of the board of county commissioners an order was entered granting the Southern Independent Telephone Company a franchise to construct, reconstruct, maintain and operate telephone lines along, over and under the public roads and highways of El Paso County for a period of twenty-five years.

PILOT POINT, TEX.—The North Texas Telephone Company has been granted a franchise to operate a telephone system in this place. The officers of the company are: S. W. Porter, President; S. D. Donaho, Vice-President; C. A. Shock, Secretary-Treasurer and General Manager, all of Sherman, Tex.

LARAMIE, WYO.—Mr. J. M. Rich, representing Salt Lake City capitalists, has applied for a franchise to operate a telephone system in Laramie. Similar applications are being filed in other cities throughout the territory by Mr. Rich and his associates who contemplate developing the territory to the fullest extent.

FINANCIAL.

NIAGARA FALLS, N. Y.—The Board of Aldermen of this city have voted to return to the Home Telephone Company a rebate of $136.92 on its franchise tax valuation. The valuation was first placed at $38,500 and later reduced on order of the Supreme Court to $31,385. The city clerk was ordered to draw the amount from the general fund.

PIERRE, S. D.—The assessment of telephone valuations by the Board of Equalization for this State was placed at $863,000 for this year, as against $740,000 for last year.

SALT LAKE CITY, UTAH.—The board of directors of the Utah Independent Telephone Company has appointed the firm of Herbert J. Grant & Co., the fiscal agents for the financing of the company. A large part of the sum required to buy the bonds and stock from the eastern owners has already been subscribed by the local syndicate.

WINNIPEG, MAN., CAN.—The Manitoba government has decided to accept the offer of Wilson Smith, Montreal, for the purchase of $500,000 telephone debentures at a rate to produce 4.43 per cent. This money will be used for the construction of government systems here and at Brandon. Address all communications to Hon. J. H. Howden, minister of telephones.

ELECTIONS.

SOUTH MANCHESTER, CONN.—The annual meeting of the Bolton and Coventry Telephone Association will be held this week at the home of John Cairns, the president of the association, in Belknap. Officers will be elected and action taken on extending the lines of the company.

BUTTE, MONT.—The Montana Independent Telephone Company has

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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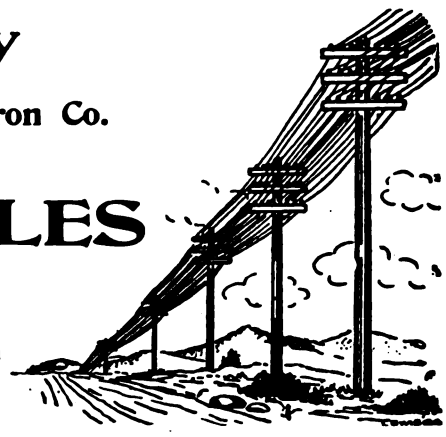

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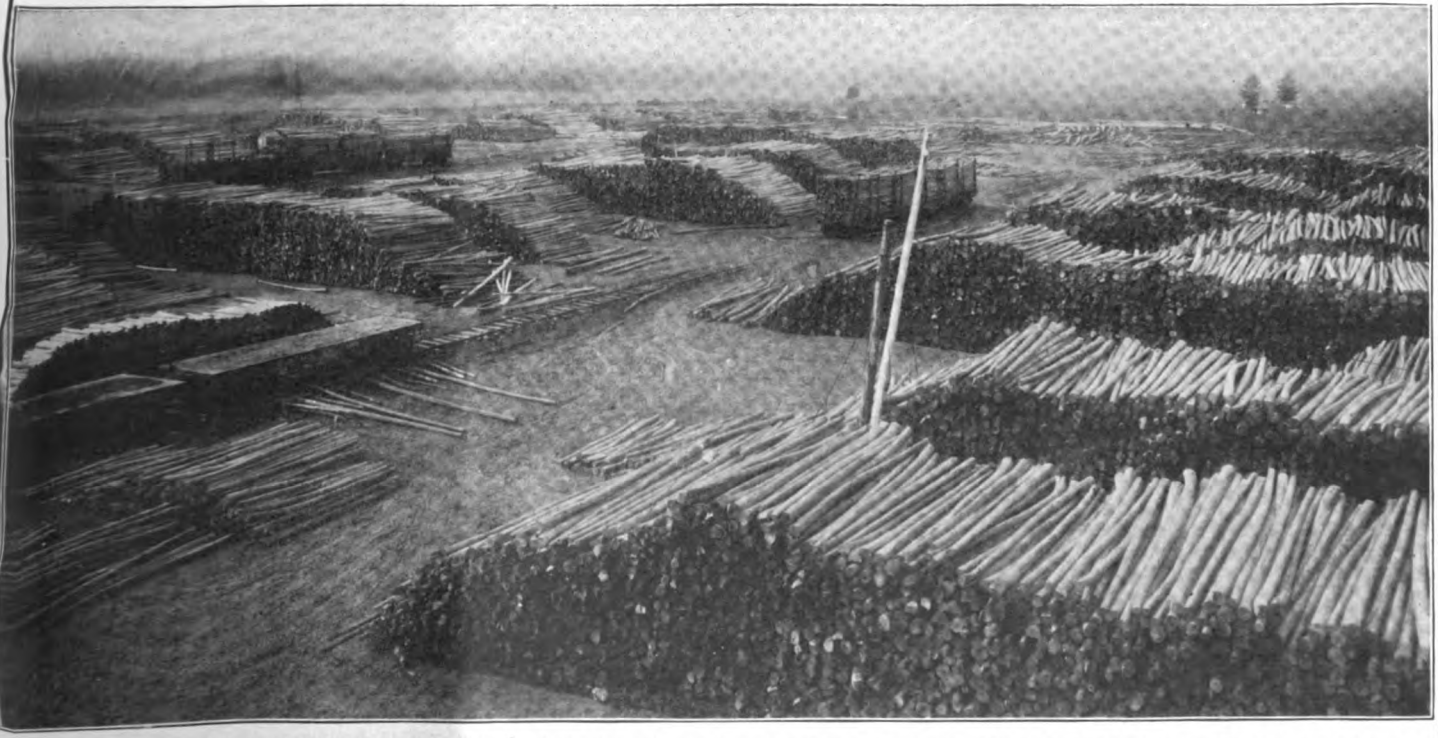

VIEW OF OUR YARDS AT ESCANABA, MICH, TAKEN JULY 1ST, 1907—To keep our loading gangs busy during the dull summer months we are naming very attractive prices. Write us for delivered prices. We also handle chestnut and western red cedar.

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Non-Technical News Items

elected the following officers for the ensuing year: President, H. A. Gallwey; Vice-President, P. B. Moss; Secretary and Treasurer, C. J. Kelly; Managing Director, T. S. Lane.

COMBINATIONS.

ONEONTA, ALA.—The Oneonta Telephone Company has sold its line from Oneonta to Hunt, via Rosa, Cleveland and Blountsville to the Blount County Consolidated Telephone Company. The consideration being $515. This gives the Consolidated company about seventy-five miles of line.

CARBONDALE, ILL.—At the monthly meeting of the directors of the Farmers' League & Community Telephone Company it was decided to unite this company with the Farmers' Mutual Telephone Company, of Wolf Lake.

BREWSTER, KAN.—The Kansas and Colorado Toll Line Company, a new organization composed mostly of the owners of the Goodland Telephone Company, has purchased the short line from Brewster to Colby and have made arrangements to connect with Central State Telephone Company at Colby.

MISCELLANEOUS.

DANVILLE, KY.—The East Tennessee Telephone Company is having a small telephone war with the council of this city. As an outcome of a raise in rates by the telephone company an ordinance was offered at a recent council meeting reducing the rates on residence telephones from $2.00 to $1.50 and the telephone company threatens to leave the city if the ordinance is passed.

AUSTIN, MINN.—Recent electric storms have done some damage to the telephone poles and lines of the telephone company in this city.

GREAT FALLS, MONT.—The labor council of this city has requested that all business men discontinue the use of and insist upon the removal of all Bell telephones.

BEAUMONT, TEXAS.—The Beaumont Telephone Company reports that the damage to cables occasioned by recent storms was very slight and would in fact not exceed $25 instead of being severe as incorrectly reported in our issue of August 10th. Several severe storms have been experienced in this section recently, but the only damage to the Independent exchange has been due to the burning out of fuses by lightning. The Southwestern Telephone and Telegraph Company suffered very heavily at Beaumont from broken lines, one of which coming in contact with a street railway wire killed a negro, and a similar accident to the lines of the same company was the cause of the death of two mules.

PARIS, TEXAS.—It is reported that the Citizens' Telephone Company has received orders for about 500 new telephones which are being installed as rapidly as possible. This is a clear gain for the Independent company, corresponding to the loss of a like number of instruments of the Bell company which have been ordered out by its subscribers.

PERSONAL.

W. P. BEARDSLEY, who has for some time past been carrying on the duties of superintendent of the Harrisburg district of the American Union Telephone Company and also those of traffic manager, has resigned the former position to devote himself entirely to his work in the newly created position of general traffic manager.

A. A. CUNNINGHAM, who has been in the traffic department of the Southwestern Telephone and Telegraph Company at Little Rock, Ark., has recently assumed the management of the exchange at Beaumont, Texas, succeeding Mr. T. B. Lyons, who has resigned and returned to his permanent home at Detroit, Mich.

A. B. HOOD has been appointed manager of the exchange of the Cumberland Telephone and Telegraph Company at Alexandria, La.

CHARLES PEEL has been promoted to the management of the Sterling (Ill.) exchange of the Interstate Telephone and Telegraph Company.

H. F. SNYDER has been appointed manager of the division of the American Union Telephone Company, which has its headquarters at Williamsport, Pa.

WILLIAM G. UNDERWOOD has been appointed manager of the exchange of the American Union Telephone Company at Chambersburg, succeeding Mr. Charles A. Carl, who has been appointed to the management of the Harrisburg division.

With the Builders

RICHMOND, IND.—The new telephone system which is now being installed by the Richmond Telephone Company is nearing completion and it is expected that it will be in service by September 1.

CANTON, ILL.—The Interstate Telephone Company has recently closed a contract with the Canton Home Telephone Company for the construction of a toll line from Peoria to Canton which will give the local company toll connection with all the principal cities of the state.

ARCADIA, IOWA.—The West Side Telephone Company is erecting new pole leads and otherwise extending and improving its system in Arcadia.

NEWTON, IOWA.—The Jasper County Telephone Company is planning many improvements and extensions in its system at this place. Address communications to A. R. Morse, manager.

PADUCAH, KY.—The Home Telephone Company is extending its lines into the rural communities and adjoining cities. It has recently constructed new lines to Folsomdale and Boaz Station.

IRONWOOD, MICH.—The Ironwood Telephone Company is building new toll lines in the northern section of the county and connecting with the lines of the Ontonagon County Telephone Company's lines.

NORTHFIELD, MINN.—The Northfield Telephone Company is extending its service rapidly. It already has over seventy miles of line completed with over two hundred telephones in operation. It will continue extending its lines in all directions in order to fully develop the territory in which it operates.

BUTTE, MONT.—The local exchange system of the Montana Independent Telephone Company is rapidly nearing completion. The company has contracts for 2,500 telephones which will be installed just as quickly as they arrive. It also contemplates a thorough system of toll lines connecting all of the exchange systems of the company.

JAMESTOWN, N. D.—The North Dakota Independent Telephone Company is doing a large amount of construction in and around this city. The new toll line running from Valley City to Jamestown is nearly completed and the company will soon be able to furnish telephone service to Buchanan, Melville, Pingree and Edmunds. In order to supply additional facilities for increased business two extra circuits are being strung between Fargo and Casselton and one extra circuit between Fargo and Valley City.

MANDAN, N. D.—The Mandan Telephone Company has very nearly completed the installation of its new exchange equipment which is of the latest and most improved type. Upon the completion of the exchange end of the system the company contemplates a complete overhauling of the outside construction.

FORT THOMAS, OHIO.—Plans for a new telephone exchange building for Fort Thomas are being made by Architect Harry Hake. The building will be two stories high and particularly adapted for use as a telephone exchange.

ALMA, WASH.—K. F. Briggs, of this city, is endeavoring to interest the citizens of Okanogan in an Independent telephone system. He has just completed a toll line from Chesaw to this place and to the station at Myncaster. He will soon establish an exchange at Chesaw and develop that territory.

ANACORTES, WASH.—Work has been commenced on the office building of the Farmers' Mutual Telephone Company. The construction of lines between this place and Burlington is now being carried on as fast as is possible.

WHEELING, WEST VA.—The National Telephone Company is hanging a new one-hundred-pair cable from Park View to Elm Grove. This will increase the company's facilities in that section and enable it to meet the demands for service in and beyond Elm Grove.

ORMSBY, WIS.—The Union Telephone Company has recently completed the line between Ormsby and Antigo upon which it has been working for some time. Other lines will be built in the near future connecting the system with further towns in the county.

EVANSTON, WYO.—The Hilliard Telephone Company which was recently organized with a capital stock of $2,000, Chas. A. Stone, president, has completed the setting of poles between Evanston and Hilliard and will immediately commence stringing its lines.

KENTON, MAN., CAN.—The farmers around this place are discussing the advisability of building a rural telephone system. Address all communications to G. A. Titmus.

UNDERGROUND.

PONTIAC, MICH.—The remodeling of the plant of the Oakland County Telephone Company by Stone & Green, contractors, contemplates the installation of a very comprehensive system of underground construction.

ST. JOSEPH, MO.—The city council at a recent meeting discussed the advisability of forming a conduit company for the purpose of constructing a conduit system sufficiently large to accommodate the wires of the telephone companies, electric lighting and power companies as well as the telegraph.

EL PASO, TEX.—An ordinance has been passed by the city council declaring all telephone poles planted within the streets or alleys within the inner fire districts and all poles in streets or alleys within the outer fire limits carrying over one hundred pairs of wires as nuisances, and ordered down by the city. This means that telephone companies will be obliged to install conduit systems for the accommodation of their cables.

TACOMA, WASH.—The Home Telephone Company has completed the installation of its conduit system and will remove the old aerial lead poles from the streets at an early date.

WINNIPEG, MAN., CAN.—At a meeting of the Manitoba cabinet it was decided to at once proceed with the construction of conduits and exchanges necessary for the government system in Winnipeg and Brandon.

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The American Telephone Journal

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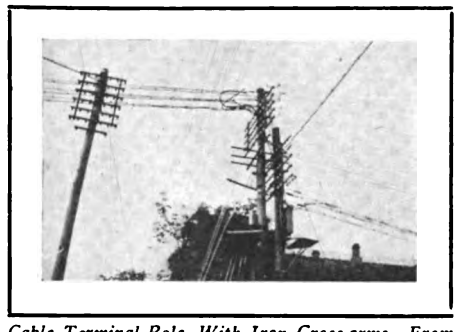
VOLUME XVI. SATURDAY, AUGUST 31, 1907. NUMBER 9.

Notes on Telephone Development and Service in Japan

Article III—General Observations

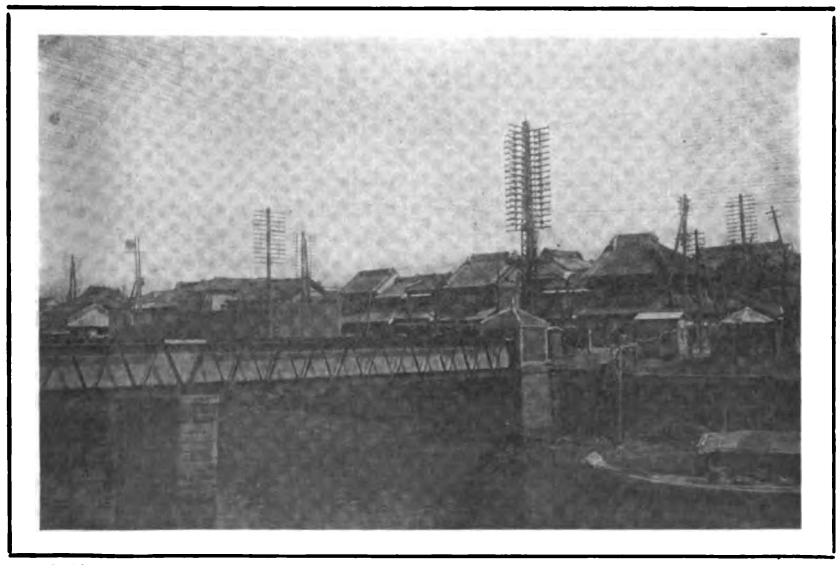
By G. C. Hodge.

THE unfortunate effect of a lack of funds upon telephone development is more clearly seen in Japan perhaps than anywhere else in the world. This is the reason assigned for the comparatively low development in many places, and it is a fact that the condition has seriously hampered the department of telephone administration in building up its exchanges. At the present time, throughout the Empire, the telephone officials find their construction woefully behind the orders received from those who wish to become subscribers to the service. In the city of Tokio alone it is reported that there are about 10,000 names on the waiting list. While the writer was there last year, the contracts which were being filled included many made in 1899. In Kyoto about 3,000 names are still on the waiting list, and throughout the other important towns of the empire a proportionate number of delayed orders will be found. Inquiry of one of the proprietors of the principal hotel in Kobe brought out the fact, in response to a request for the reason why he had no telephone in his hotel, that his order had been placed five years ago. At the time the inquiry was made, he stated that he had hopes of buying out a subscriber's interest in a line within a month or two. In Japan the privilege of having a telephone seems to be bought or sold in the cities in the same way that seats in a stock exchange are dealt in here.



Cable Terminal Pole, With Iron Cross-arms. From Photograph Taken During Reconstruction.

The rates in Japan would hardly be considered low when other things are taken into consideration. In Tokio, as has been mentioned before, the rates are 66 yen ($33.00) a year; while in Yokahoma and other cities 54 yen ($27.00) is the price. These rates are charged for either business or residence instruments upon individual lines. There are no party lines and consequently only a single rate is charged. Throughout the Empire the total number of subscribers in 32 exchanges was for 35,555 in June, 1905; that is the latest date for which statistics were available at the time of the writer's visit.



Bridge at Tokio, Japan, Used Exclusively for Supporting Wires Above the River.

Conversations over toll lines are carried on at comparatively low cost; in fact, considering the five-minute limitation which prevails, the rates appear to be very low for this class of business.

Salaries paid to the employees in the higher grades seem to be based on a very fair scale. Managers of offices receive from 50 to 100 yen per month. Troublemen get between 20 and 30 yen; linemen, 40 sen to 1 yen per day and livery, while operators receive 25 to 35 sen per day. A yen is equivalent to 50 cents and the sen to one-half a cent. Of course in comparing these wages with those which prevail in other countries, it should be taken into consideration that the cost of living in Japan is just about one-fifth of what it is in the United States or Canada.

In the distribution of wires, advantage seems to be taken at the present time of a considerable number of modern ideas in regard to cable construction, but this type of work seems to be hardly on a par with the high grade construction embodied in long distance open wire lines. In Tokio the writer believes that there are about 120 miles of underground conduit and about 700 miles of pole lines. There is also considerable aerial cable, but the writer has no figures available showing the exact amount. It seemed, however, that a great deal more aerial cable could be used to advantage. Not only could it be used very properly to do away with some of the pole leads, but it would be convenient for replacing some very awkward "buck-arm" corners and would undoubtedly reduce the maintenance charges and improve the service. Most of the cable used seemed to be manufactured in either England or Germany, and there appears to be no reason why some of the

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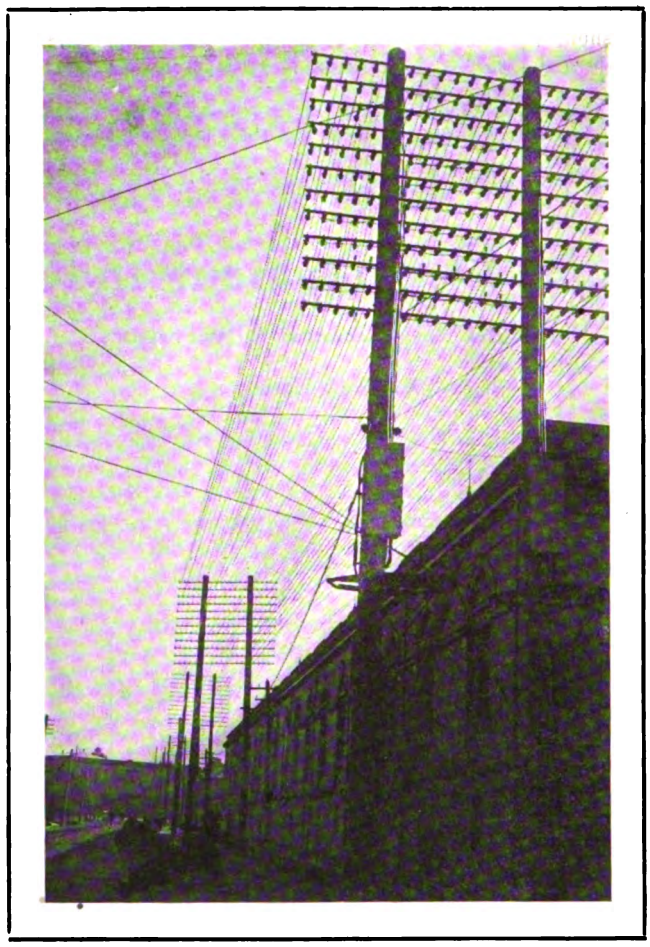
enterprising manufacturers on this side of the water should not be able to compete on satisfactory terms with the old country firms.

In connection with the cable system at Tokio, one of the most interesting features is the steel bridge, illustrated on the first page, which is built exclusively for carrying cables from conduits across a small canal or branch of a river. So far as the writer knows, this is the only structure of the sort in the world built especially for such a purpose. From the outsider's standpoint, it appeared to be a very expensive piece of construction to be devoted to this exclusive use, as at a very little extra cost it could also be utilized for traffic and would thus have relieved another bridge about one hundred feet below, which seemed to be crowded all the time.

The extensive use of public pay stations might well be predicted from the fact that the company is so far behind its orders for subscribers' stations. As a matter of fact, that may not be without certain advantages, for the writer noticed especially the number of public pay stations which are placed in the most accessible locations. The instruments which are fitted with slot machines are in specially built booths and are placed at every third or fourth corner. It was unusual to pass one which was unoccupied.



Exterior View of New Exchange, Head Office, Tokio, 1899, Before Underground was Put In.

During his stay in Japan the writer took a considerable number of photographs of outside construction work. The climate of the country, however, is very bad for films and a considerable number of failures had to be registered when the negatives were developed. The photographs appearing in connection with the series of articles which closes in the present issue cover the most representative views obtained.

THE LONG TELEPHONE LINE OF THE MEXICAN CENTRAL RAILROAD.

ONE of the longest copper wire telephone lines in the world is being constructed by the Mexican Central Railroad, which is stringing the last section of wire on this line from El Paso, Texas, to the City of Mexico, 1,325 miles. C. R. Hudson, vice president and general manager of the Mexican Central, in an interview, states that the telephone is a proven success on his road and that the system will be extended to cover every mile of the company's tracks. The line is being very substantially constructed with strong cedar or bois d'arc poles and the heaviest copper wire. Mr. Hudson says that the system is a great saving to the telegraph wires and the portion now in use relieves the other wires of everything except train orders. Superintendents communicate with the general manager's office every day and each station agent and section foreman is in easy touch with each superintendent's office. In case of a mishap with a section crew the foreman has an instrument and can connect with the wire and call the nearest station at will. Trains breaking down on the line or hindered by wrecks can also communicate with the nearest telegraph office, as each conductor carries an instrument and necessary wire for connections.

Condenser Testing

By Bruce V. Hill.

MODIFICATIONS of well known methods of measuring capacities, as described in this article, are offered as suggestions to those who may have occasion to use them in a practical way. In the American Telephone Journal for September 29, 1906, page 203, was an article on the testing of condensers which led the writer of these notes to make a somewhat closer study of the matter, for such condensers as are ordinarily used in telephone work. Several of these were also compared to a standard mica condenser. A full discussion of these experiments, made at the University of Kansas, will be published later, but it is the purpose of the present article to discuss a few methods of testing which are well suited to the various conditions met in the field. If only a fair degree of accuracy be desired, the bridge method, as given in all of the standard texts and as outlined in the article referred to above, serves very well and is rapid. A frequency of more than 100 is not necessary, however. Using arrangements to be described later, capacities measured varied by amounts too small for accurate determination for frequencies between 16 and 125. Between 125 and 3,000 a standard mica condenser decreased in capacity about 1 per cent., while the worst paper condenser at hand decreased but 2.55 per cent. between the same limits of frequency.

All condensers absorb to some extent, though in good ones the amount of absorption is very small, and the effect is that of a perfect condenser with a resistance in series with it. If this equivalent series resistance were large in the condenser being tested, and small in the standard, the result obtained by the bridge method would be too small. This error is ordinarily too small to be taken into account, however.

It is perhaps better for some reasons to compare a capacity to a coil possessing self inductance. If the wire of which this coil is made is not larger than No. 24 B. and S., the change of resistance and inductance with frequency is not greater than one part in a thousand up to frequencies of 3,000. The temperature may be held reasonably constant. The objection to making inductance

Editor's Note: This is the first of two papers on this subject by Mr. Hill.

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coils of wire having a low temperature coefficient is that the high resistance of these materials decreases the lag due to the inductance of the coil.

The arrangement shown in Fig. 1 is known as Maxwell's method of comparing a capacity with a self-inductance. In one arm of the bridge is a coil of inductance L and resistance r^4, while about the opposite arm, r^1, is shunted the condenser of capacity C. The key k^1 is closed and the arms r^1, r^2, r^3 adjusted until there is no current in the galvanometer when K^2 is closed. The key, K^2, is then closed and the arms adjusted till there is no kick of the galvanometer when K^1 is opened or closed. This had destroyed the original balance which must be again approximated, and so on till both adjustments are in order at once. When this is the case and the galvanometer is not affected when either key is opened and closed, the relations

$$r^1 : r^2 = r^3 : r^4 \qquad (1).$$

and

$$L/C = r^1 r^4 \qquad (2).$$

hold. If the inductance L, in branch 4, be variable, the resistances may be varied until condition (1) is fulfilled and then the value of L may be altered until (2) is also satisfied and much

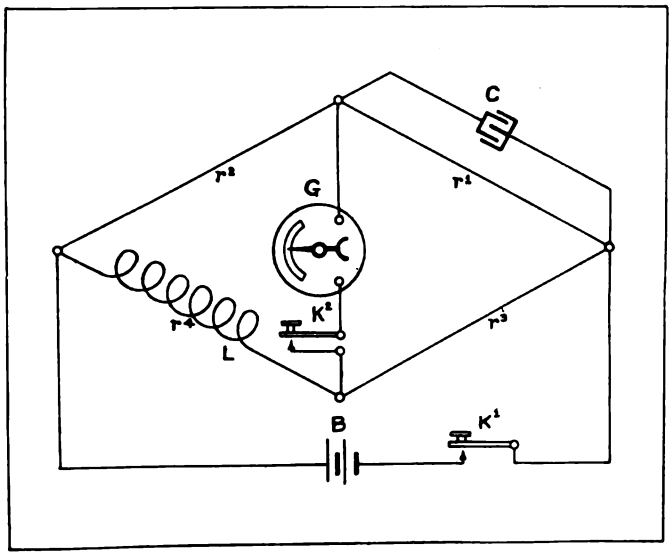

Fig. 1. Circuit showing arrangement of apparatus for measuring a capacity by comparison with inductance known as Maxwell's method.

time is saved. Such a variable inductance in a convenient form consists of two coils, one fixed and the other movable about a vertical axis, wound upon surfaces which are parts of two concentric spheres.

Even with the variable inductance, however, a continuous adjustment is not possible, for the galvanometer has to come to rest after every trial adjustment. This inconvenience may be overcome very easily in the manner indicated in Fig. 2.

The battery wires lead to the middle points of a six-point key or D. P. D. T. switch (Q). One side of Q is connected to a battery and the other to a source of alternating current. In a similar manner the other corners of the bridge are connected to the middle points of a key, or switch, one side of which is connected to a telephone receiver and the other to a galvanometer. An operator's ringing key may be made to serve both purposes at once. With the lever in one position, the battery and galvanometer are thrown in, while the other position of the lever connects the alternating current and the receiver. The arrangement illustrated in the diagram of Fig. 2 is shown in the third figure. Putting the lever in the first position, a balance is obtained in the ordinary manner as in measuring resistances with the Wheatstone's bridge. Then, with the key in the other position, the variable inductance is altered until the sound in the receiver is a minimum. If the temperature remains fairly constant, the bridge balance will hold without readjustment and the condensers to be tested can quickly be connected in this system and the inductance set to the proper value. The capacities corresponding to various combinations of resistance and inductance may be tabulated and further calculations thus avoided.

In this connection it may be remarked that the apparatus described on page 331 of AMERICAN TELEPHONE JOURNAL for May 18th, 1907, contains no new feature, but is simply a very slight

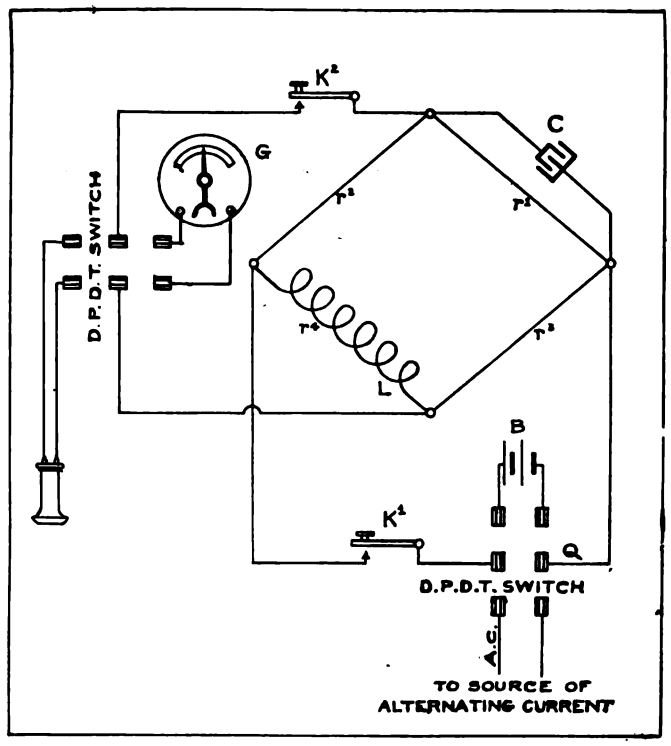

Fig. 2. Practical arrangement of apparatus for convenient application of Maxwell's method of testing capacity.

recombination of methods which have been used for years in testing laboratories and are outlined in the standard manuals.

In the method described above, no account is taken of the absorption of the condenser. If this were appreciable, perfect silence could not be obtained in the telephone when the bridge was balanced for steady currents, but only a minimum of intensity of the sound. Settings may easily and quickly be made to 0.2 per cent., which is the limit to which ordinary resistance boxes are correct.

Fig. 3. Testing capacity of condenser with apparatus indicated in Fig. 2.

CALIFORNIA CITY ENTERS OFFICIAL PROTEST AGAINST RECKLESS TREE TRIMMING.

MAYOR EVANS, of Riverside, Cal., has been obliged to address an official protest against careless and unwarranted trimming of trees to telegraph and telephone companies. The trees are reported to have been damaged in many cases which the adoption of a cable system would prevent.

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Talking and Telegraphing Simultaneously Over the Same Line

Article IV—Arrangement of Apparatus for Facility in Handling

By N. C. Kissell.

RAPID manipulation of combined telephone and telegraph circuits is one of the most essential things to be secured by an appropriate layout of apparatus used under practical operating conditions. Simplex and composite circuits must be so arranged that in case the line over which one is being operated becomes in trouble, it can be shifted to another line in good working condition without any unnecessary delay. At times a composite must be substituted for a simplex set and vice versa, or two lines need to be simplexed to create a third or phantom talking circuit. In practice each of these things has to be done at a moment's notice, and in doing it there must be no interference with a conversation going on over the line at the time. These things are accomplished by means of a test board into which all the toll lines enter, and a telegraph switchboard.

Connections in Fig. 1 indicate a toll line passing through the test board into the toll board. The line enters through a fuse and carbon arrester on the main frame, from which it passes to the toll intermediate frame. From here it goes through cable into the test board, back again to intermediate frame and into the toll board. At the toll intermediate frame the line is cross-wired to the desired position or jacks on the test board, and also to the assigned multiple and answering jacks in the toll board.

When the test board man plugs into the jacks *a* with a double plug he connects himself directly with the line, for testing purposes, and cuts off the toll board. By plugging into jacks *c* he connects himself directly with the toll board, cutting off the line. Upon plugging into jacks *b*, he connects himself with the line, cuts off the toll board and lights all the busy lamps associated with the toll board multiple jacks of that line. This denotes to all the operators that the line is busy. If this were not provided for an operator might go in on this line while it was cut off at the test board, and not being able to raise the distant end, would report the circuit in trouble. Each toll line in the board is provided with a ring down relay *G*, and a cut off relay *J*. The ringing current entering on the line passes through the contacts on relay *J*, and through the 600 ohm winding of relay *G*. This causes it to release its shutter, which is made heavy, and make a circuit from 24 volt battery, through line lamp *H* and contacts on shutter to ground and thence back to battery, thereby lighting the lamp. The operator, upon seeing this, plugs into a jack and positive battery from the sleeve of her plug passes through the sleeve of the jack, through cut-off relay *J* and the 45 ohm winding on relay *G* to ground and back to battery. This causes relay *J* to draw up its armature, disconnecting one side of the line relay from the line, lighting all the busy lamps at the multiple jacks, and drawing up the shutter on relay *G*, thus extinguishing the lamp. Between the line and the line relay are placed heat coils to protect the delicate winding on the drops.

The jacks on the test board are built up in panels comprising three rows of jacks up and down, each row having 40 jacks, making provision for 20 toll lines in each panel. On each side of these panels are placed double plugs, one on the left and one on the right. The plugs on the left are wired to the line sides of the simplex and composite sets, and those on the right to the drop sides.

Fig. 2 shows a diagram of a modern type of test board. This shows two panels of jacks each having a capacity of ten toll lines. On the left hand set in the face of the board are the plugs for the line sides and on the right the drop sides of the simplex and composite sets. The "Morse" legs are wired to single plugs placed in the face of the board between the two jack panels. The rows of jacks on the left in each panel are the line side and those on the right are the drop sides. Below the "Morse" legs are placed jacks set in the board in rows, three in a row across. The first and second rows are wired to extra lines to the toll board which are completely equipped. These are used for emergencies. For example, a line may develop serious trouble in the board, such as a burn-out or a short circuit difficult to locate, and it will require some little time to clear the trouble. This means the loss of the line until proper terminal apparatus is working, and the line wires might as well be broken down as far as the use of the line for talking purposes is concerned. When this happens, a two conductor cord equipped with a double plug on each end can be used to make the line good by inserting one plug in the line side of the jacks of the circuit in trouble thereby cutting off the board, and the other plug in one of these extra lines. Consequently no loss is suffered, no matter how much time is consumed in clearing the trouble. Below these extra line jacks are two rows all connected together as a single jack. The purpose of this arrangement will be explained later. Below these jacks are trunks to the "Morse" board, the one on the right being the terminating jack. The trunk starting from here passes through the other two in the row in series, and from there into a set of jacks on the "Morse" board. This trunk is a single wire and at the "Morse" board is handled simply as a telegraph wire, or, in other words, the toll line entering the test board is changed to a telegraph line entering the telegraph board. Between the jacks of each line designation strips are screwed to the panel, plainly indicating the name of the circuit and the pin numbers. Designation strips are also placed under the plugs on the line and drop sides and under the "Morse" legs. The trunking jacks are also numbered corresponding to numbers on the "Morse" board. This avoids confusion, as everything is plainly marked as it should be. The plugs on the left and right of the test board are connected in multiple enabling the same simplex or composite set to be used at either panel without pulling the cords across the face of the board. Composite apparatus and repeating coils used for the simplex circuits are mounted on

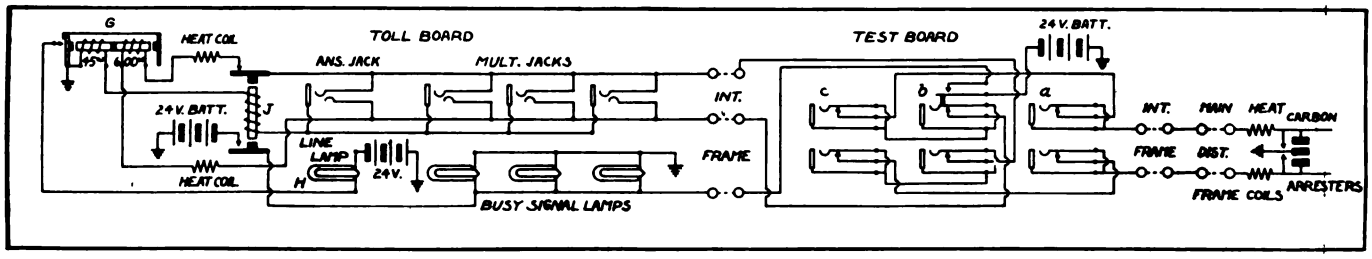

Fig. 1. Ordinary toll line connected through test board to permit of attachment of apparatus for simplex, composite and phantom circuits and testing of circuits by the wire chief without loss of time.

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racks, and wired directly to the terminating plugs on the test board in cable. The composite ringer relays are also mounted on a rack, by means of a mounting strip, with the exception of the high frequency relay which is so sensitive that it is subject to jars occurring in the room, such as are caused by walking on the floor. It has been found in practice that they must be mounted on something very substantial, such as a firm brick wall. The composite ringer relays are wired directly into the composite sets, and one interrupter is wired for five ringers. When plugs are inserted in the line and drop sides of the jacks, the test board man can come in on the line by means of the middle jacks, at the same time lighting the busy lamps on the toll board in order to prevent operators from putting up outward calls while he is testing.

If it is desirable to operate two "Morse" wires on one telegraph line coming in from the east is to be continued to the west, the respective lines are simplexed and trunked to the "Morse" board. Here they are connected together by means of a telegraph repeater, thereby making a telegraph line which passes through the board while the telephone lines terminate.

(To be Continued.)

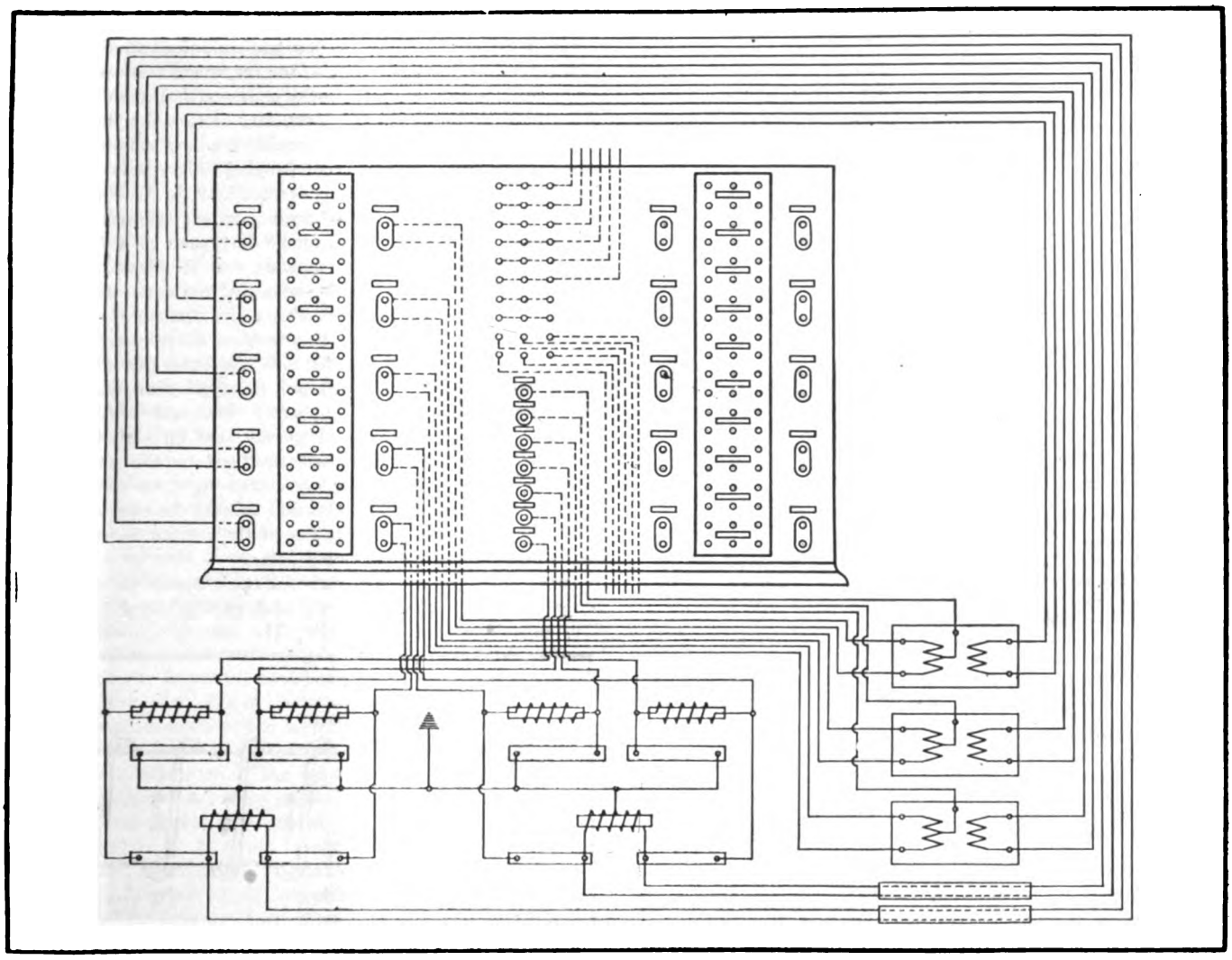

Fig. 2. Diagram of a modern test board, with arrangements for connecting telegraph or phantom apparatus to any toll line. This board is especially designed to facilitate quick manipulation in practice.

phone line, the test board man takes the two plugs of a composite set and inserts them in the proper jacks. If he does this quickly no interference will be experienced in case there is a conversation going on over the line. As each composite set has its own ringer wired into it, the insertion of the plugs in the line jack places the composite ringer in the circuit. Having placed the composite set in the line, the two "Morse" legs which are wired to the single plugs are inserted in the trunking jacks to the "Morse" board. Thus in a few seconds it is possible to add to a telephone line apparatus creating two telegraph lines, and connect them to the "Morse" switchboard. Here the repeater men take up the circuits and operate them for telegraphic purposes. If the line goes in trouble the plugs can be pulled out at the test board, and inserted into jacks connected to good line without disturbing the layout on the "Morse" board. If a tele-

BULLETIN NO. 3 OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION.

THE present administration is pledged to a policy of strengthening the international organization in every way possible. It must depend upon and asks the co-operation of the affiliated associations in carrying out this purpose. Officers of these associations are therefore urged to begin district meetings without delay, as suggested in Bulletin No. 2, and to take the necessary steps to eliminate any weak points in their organization.

District Plan the Best.—Associations which have not already divided their territory into districts should arrange to do so at once. Experience has demonstrated the advantage of the district plan over all others.

To Get Results.—Whenever practicable, each association should engage some one to give its affairs exclusive attention in an official capacity. This method has been productive of splendid results wherever adopted.

Wanted—Statistics.—Each association should arrange to bring statistical information covering its territory right up to date, and report it promptly to the General Office at Cleveland. This is important. Those who have not been giving the subject the attention it deserves should do so at once. Forms of blanks, reports,

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etc., to be used in gathering this data may be secured free upon request.

Committee on Litigation and Legislation.—After careful consideration your president has appointed the following Committee on Litigation and Legislation: Dwight E. Sapp, chairman, Mt. Vernon, O.; A. L. Tetu, Portland, Ore.; Frank H. Woods, Lincoln, Neb.; J. B. Earle, Waco, Texas. All of these gentlemen are peculiarly qualified for taking care of the work which will devolve on their committee. They are all actively identified with large operating interests and are well known to the Independent people everywhere as representative men. Your association is to be congratulated upon having secured their services.

Revised Constitution.—The constitution, as revised at the last convention, is being printed for distribution. Copy free upon request. Address the Cleveland office.

FINANCIAL STATEMENT, AUGUST 15, 1907.

Apportionments by Executive Committee for 1907-8.

Associations:		
Arkansas	$100.00	
California	300.00	
Canada	25.00	
Illinois	750.00	
Indiana	1,000.00	
Iowa	700.00	
Kansas	400.00	
Kentucky	200.00	
Maine	25.00	
Michigan	750.00	
Missouri	500.00	
Nebraska	350.00	
New York	300.00	
North Carolina	25.00	
Ohio	1,300.00	
Oregon	40.00	
Pennsylvania	500.00	
Texas	100.00	
Vermont and New Hampshire	25.00	
Virginia	50.00	
West Virginia	250.00	
Wisconsin	250.00	
		$7,940.00
Contributions and Pledges Switchboard and Telephone Manufacturers:		
Equipment stamps	$6,500.00	
Mag. tels. and drops	4,000.00	
C. B. tels. and drops	2,500.00	
Supply dealers and jobbers	5,000.00	
Engineers	250.00	
Journals	500.00	
Operating Company	750.00	
		13,000.00
General:		
Honorary membership fees	$750.00	
Miscellaneous accounts	791.14	
		1,541.14
Total		22,481.14
Paid in June, 1907		50.00
Paid in July, 1907		235.00
Balance to be collected		$22,196.14

Annual assessment 1c. per unit. A unit is an operating telephone or a circuit mile of toll line. Assessments are payable monthly, and are based on number of units in respective associations at last convention.

Fiscal Year, 1906-07, closed May 25.

Total receipts this year to date including special committee balance	$11,840.06	
Total expenditures including accounts accrued before last convention	10,838.05	
		$1,002.01
Accounts payable	525.27	
Estimated expenses for next thirty days (Publicity department not started)	325.00	
		850.27
Surplus September 15th		$151.74

N. B.—The association should have a fund of $1,500 per month for the next nine months for publicity purposes and $1,000 per month for strengthening and extending the organization. Nothing will be done by the present administration until necessary funds are pledged to defray the cost of the undertaking.

Supply Department—Discontinuance Sale.—The stock of "Shield" supplies is selling very rapidly. Get busy if you want to take advantage of the low prices prevailing. Price list and full particulars free on request.

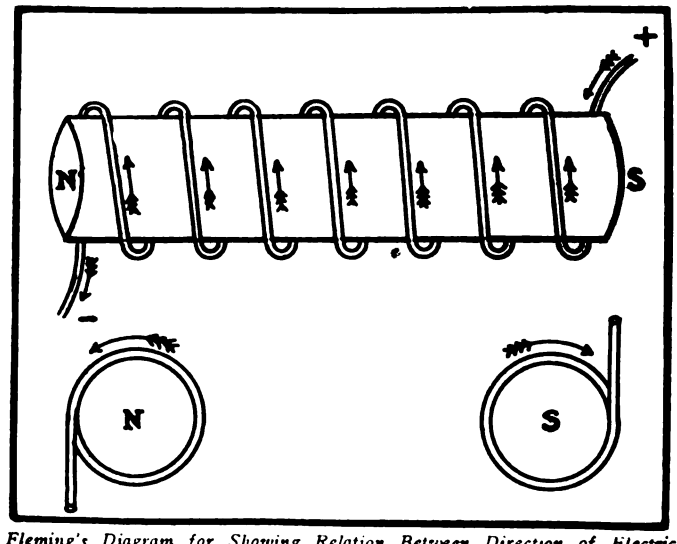
General Information Wanted.—If anything telephonic occurs within your range, inform the Home Office. Tell about such things as good openings for extending the Independent field, legal decisions affecting the business in any way, or anything which it seems to you would be interesting.

RELATION BETWEEN DIRECTION OF MAGNETIC FLUX AND MAGNETIZING CURRENT IN AN ELECTROMAGNET.

IN the article by Mr. N. C. Kissell, published in our issue of August 10th, reference is made to the direction of magnetic flux in a closed iron core when the electric current passes through a winding in a definite direction.

Referring to the statement made, Mr. Kissell calls attention to an error and to the fact that, in order to make the statement read correctly, the letters *b* and *c* should be transposed. That is to say, the statement would be correct with reference to the figure shown if *c* were made the positive and *b* the negative terminal of the circuit, just the opposite conditions to those stated. This is in accordance with one of the fundamental laws of electromagnetism, which is well known to many, but which has been so well put by some famous electricians as to make their illustrations worth repeating for the benefit of a few who occasionally forget these things. The accompanying diagram is reproduced from "Magnets and Electric Currents," by J. A. Fleming, and shows how the poles in an electromagnet are created by current passing in the direction indicated. Everyone is familiar with other diagrams of a magnet, showing that the lines of magnetic force pass inward at the south pole, and outward at the north; so there is no need of emphasizing the statement that inside the core the direction of the flux is from the south towards the north pole, while outside of the core it is from the north toward the south pole. With this in mind, the application of Mr. Fleming's rule is very simple. He says: "If a bar of soft iron is placed in a helix of wire, and current sent through the wire in such a direction that when looked at end on the current, if it could be seen, would appear to revolve right handedly, or like the hands of a watch, then that end nearest the eye is the south pole." Of course if the direction of the current is reversed the nearer pole would be the north pole.

Another statement which makes a ready appeal to the memory is the famous corkscrew rule or analogy originated by Maxwell. This may be stated as follows: The direction of the lines of



Fleming's Diagram for Showing Relation Between Direction of Electric Current and Magnetic Polarity in a Solenoid.

magnetic force in an iron core, due to the passage of an electric current in a coil surrounding it, is to the direction of the current as the direction of rotation of a corkscrew is to the direction of its thrust.

Imagine that you are behind a corkscrew and twisting it right handedly. It will, of course, tend to travel away from you. In the same way, if you hold a solenoid in front of you and the current revolves right handedly, the magnetic flux within the coil will travel away from you.

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The Operating Companies and Men

DISCUSSIONS OF MOVING CHARGES, HOUSE MOVING DAMAGE AND OTHER SUBJECTS ENLIVEN CALIFORNIA ASSOCIATION MEETING.

THE regular quarterly meeting of the California Independent Telephone Association was held at Whittier, Cal., August 15th, in the Greenleaf Hotel.

The party, which was composed of exchange managers and officers of various companies, about 35 in number, was met at the city limits by Secretary Wardman and shown through the buildings and grounds of the State Reform School. This was followed by a ride through the orange groves of East Whittier. After an inspection of the Whittier exchange a banquet was served at the hotel and the members listened to an address by D. S. Parker of Pomona. Mr. Parker was the delegate to the International Independent Telephone Association convention, held at Chicago in June last, and gave a detailed account of the convention.

After the banquet the regular business meeting of the organization was held. Mr. A. L. Orton of Pasadena, the retiring secretary of the association, was presented with $50 in gold and a vote of thanks from the association for efficient services rendered during his term of office.

The application of the Alhambra Home Tel. & Tel. Co. for membership was accepted, as was that of the Union Home Tel. & Tel. Corporation, which operates exchanges at Long Beach, San Bernardino, Santa Ana, Ventura, San Pedro, Anaheim, Fullerton, Colton, Highland and Riverside, Cal.

The following questions were put before the members and a general discussion entered into:

1. Shall a charge be made for moving telephones?
2. Shall a charge be made for breakages aside from those caused by ordinary wear and tear on instruments?
3. What steps should be taken to protect the company from line breaks caused by house-moving, high farm machinery, etc.?

It was the opinion of the majority present that charges should be made for moves and breakages and the greater proportion of the companies represented are making the charges and collecting the accounts.

In the matter of house-moving it was found that the plan of making with the house-mover prior arrangements for the settlement of the damage was the best way for all concerned.

An informal canvass of the members showed a very gratifying state of affairs. All the companies are growing and thriving in the face of competition. The association is in fine shape and the meetings are a source of much good to all the members.

Among those present were: K. C. Wells, Redlands; J. O. Houser, Covina; W. L. Frew, Compton; A. Wardman, Whittier; D. S. Parker, Pomona; F. A. Powell, San Bernardino; Arthur Wright, Los Angeles; C. H. Temple, Los Angeles; M. C. Miller, Downey; W. L. Lisenby, Long Beach; E. P. Morphy, Los Angeles; Fred E. Smith, Los Angeles; Arthur Darby, Downey; E. A. Carter, Los Angeles; A. L. Reed, Huntington Beach; N. Yenerick, San Diego; W. E. Baab, Santa Ana; F. H. Packard, Anaheim; W. G. Legg, Compton; A. Jud Shepard, Compton; A. W. Miller, Compton; L. Keller, Los Angeles; A. C. Schnetzler, Los Angeles; E. J. Anderson, Redlands; C. G. Pyle, Los Angeles; Parker Reed, Los Angeles; C. F. Hartung, Los Angeles; W. G. Stearns, C. H. Carter, H. C. Goldrick, C. A. Fourtiner, Los Angeles.

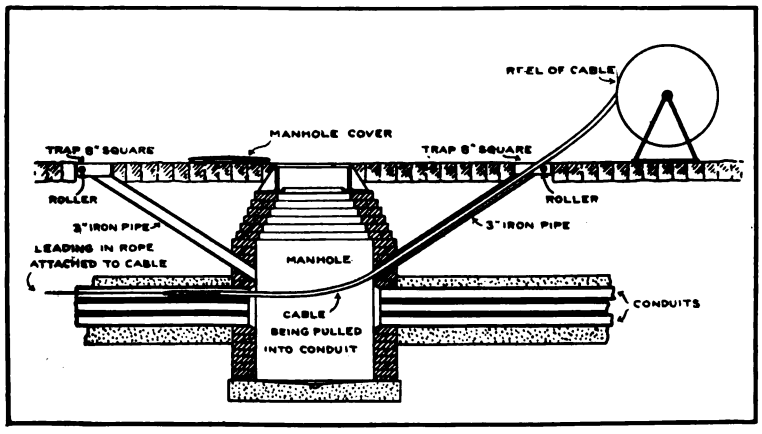
A DEVICE FOR SAVING LABOR WHEN PULLING CABLE INTO CONDUITS.

By Garry Helling.

IN installing lead covered cable in conduits it is usually necessary to have from one to three men in a manhole, according to the weight and size of the cable, in order that the bend may not become too sharp, and injure the paper insulation on the wires, thus causing trouble in the cable. As manholes are not often constructed on a very commodious plan, and are frequently very nearly filled with old cables at the time it is desired to install another, it becomes a problem to find room for these workmen in the manhole.

The writer has tried out a scheme to obviate the necessity for these men, which has given very good results. When the manhole is built, pieces of cast iron pipe 3 inches in diameter are laid at an angle of about 45° with the street, leading into the manhole just above the conduit and extending in the same direction. At the upper end of these pieces of iron pipe is built a trap 8 inches square, which should be covered with a suitable metal plate to keep out dirt and water.

When it is desired to install additional cable in the conduit, the cable is fed down through this pipe and into the manhole, where it is directed into the proper duct. In this way the leading-rope may be pulled directly from the other end of the conduit by a horse or other power and no men are necessary in the manhole, as an approximately direct pull is obtained. The laying of these pipes at the time of the construction of the manhole requires but little additional outlay, and they save in labor and time a sum equivalent to several times their cost.



Sectional View of Manhole Equipped with Pipes for Drawing in Cable.

THE OKLAHOMA CITY CONVENTION.

MEMBERS of the Oklahoma Independent Telephone Association discussed practical operating features in a very interesting manner at the recent semi-annual meeting held in Oklahoma City. Among the papers read were the following: "How to Help the Association," by E. D. Nims, Oklahoma City: "How Can We Raise the Standard of Help?" by W. J. Steel, Kingfisher; "Collections and Rebates," by P. K. Higgins, Oklahoma City; "Freaks and Fancies," by Horace Turman Geary; "Traffic and Operating Methods," by C. D. Edwards, Oklahoma City; "Maintenance," by W. M. Darnell Foss; "Construction and Methods in Small Exchanges," by L. T. Hine, Purcell; "Standardization of Apparatus," by L. H. Spencer, Pauls Valley. After the regular session a question box was held, and many additional points of interest were brought out. An adjournment was taken until the regular annual meeting, to be held in the same city in February, 1908. The officers of the association are: L. T. Hine, of Purcell, president; J. W. Wilson, of Oklahoma City, vice president; L. D. Spencer, of Pauls Valley, secretary and treasurer. The date of next meeting will be announced later.

OBITUARY.

GEORGE W. BUZZELL, secretary of the Vermont & New Hampshire Independent Telephone Association, was killed by an electric shock on August 12th. In some manner he was believed to have come in contact with a live wire receiving current from the power company.

Mr. Buzzell was a leader in Independent telephone organization in his State and New Hampshire.

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Editorial Views

KEEP AWAY FROM HIGH TENSION WIRES!

TELEPHONE managers who do not realize the responsibilities which they are incurring by putting their lines on the same poles with high tension wires should look about a little. Last week we recorded the death of two telephone men in Texas, due to coming in contact with wires carrying high tension current; and this week we are obliged to report the death of a prominent Independent telephone man whose place it will be hard to fill. Other fatal accidents are constantly coming to our attention. It really looks as if, in many cases, the careless policy of taking the risk to save the cost is being carried a little too far.

When electric light and power companies use high tension alternating currents, and telephone wires are run on the same poles, it is useless to expect to get a constant, good telephone service. Transmission is bound to be affected at one time or another by the large amounts of electricity developed by the neighboring high tension conductors. The running of telephone wires upon electric light poles, or permitting the reverse arrangement, may save a little in the first cost, but this saving will unavoidably be accompanied by a corresponding increase in maintenance expenses. Those who have gone through the experience of changing a system from magneto to common battery will recall what a lot of trouble they had to put the plant in condition to stand twenty-four or forty volts on the line. They surely ought to appreciate that it is going to cost something to keep their lines sufficiently well insulated to resist a possible leakage from twenty-four hundred. A leak that will seriously affect the transmission on a telephone line is a matter so insignificant to a power company that it does not bother to repair it, and, as a consequence, the whole burden of insulating against it rests on the telephone company.

It would be a safe wager that on more than fifty per cent. of the lines run on poles with high tension wires there is so much time spent in "fussing about to kill noises" that it would have been a distinct economy to obtain in the first place private rights-of-way, or put the wires underground.

There is more in this than service interruptions and increased cost of maintenance. The small companies are apparently very far from being the worst offenders in this respect, but where they do fall into the error they suffer more severely than others. Accidents are the cause of sudden and unexpected drains on the treasury, which are usually large enough to be felt by a small organization. In a larger concern they may not exercise directly much influence on the dividend, but they certainly do demoralize the working force and reduce its efficiency.

This is the economical side of the matter. Far above it, however, lies the duty of a public service company to protect its employees and patrons by every reasonable care and device from the risk of loss of life. The safest way to do this is to keep off the poles carrying wires which conduct electricity at high tension.

COMMON BATTERY TRANSMISSION ASSAILED BY A BRITISH ULTRA-CONSERVATIVE.

IN Great Britain's telephonic circles the name of A. R. Bennett immediately suggests certain municipal telephone plants, notably that of Glasgow, which have been very dismal failures. Still Mr. Bennett is apparently unwilling to allow his name to sink entirely into oblivion, and occasionally comes out with a communication to some British electrical journal which is occasionally spicy, frequently interesting and always and unavoidably amusing. The latest word, with which he "troubles" the editor of the London *Electrical Engineer*, is a would-be vigorous attack upon the common battery system, wherein the transmitter "is used as a conductor for heavy signaling currents," as well as for the transmission of speech. Mr. Bennett has apparently had some sad experiences, for he tells us that, although, perhaps by some special dispensation of Providence, transmission is much louder on Sundays than during week days, even this has its disadvantages; for sometimes "articulation is lost" on account of its very loudness. At other times he has had difficulty in distinguishing between the words "Yes" and "No." In his search for the lost articulation Mr. Bennett had a most unfortunate experience, having been visited by "a gentleman with an American accent, who explained that he had been brought over from the United States by the Post Office to superintend their London telephones." In the course of conversation, apparently, the American service inspector must have displayed rare native ability in sizing up a stranger. He pointed out that in the number which had been mistaken three times the figure five occurred. Mr. Bennett goes on calmly to relate that the inspector said this "was an especially bad mouthful for a common battery transmitter," and advised him in the future to "use the French word 'cinq' instead, a practice which is followed in New York with the best results."

This is the last straw! Some years ago, when the venerable naturalist John Burroughs attacked one of the men who has since achieved high prominence as a "nature faker," he referred with much gusto to a "little story of real animal life," which described how a cute old fox was in the habit of going to the shore and jumping from rock to rock, meanwhile dragging his tail in the water in order that crabs might seize it, and be drawn out to be comfortably eaten on the shore. Mr. Burroughs apparently derived the keenest pleasure from conjuring up a mental picture of some old fisherman telling for publication this highly improbable story to the city naturalist.

Of course there can be in Great Britain no telephone man whose attainments in some directions are to be compared with those of the implacable enemy of the common battery system. But if there were others so gullible, the little fox story would be well worth spreading broadcast throughout the islands.

A few other statements in the communication from which we might drag forth so many amusing quotations, in connection with the records of the defunct municipal plants, show into what sad straits one is likely to be led when he fails to consider both questions of service and economy closely as a basis for the electrical design of a plant. Mr. Bennett objects to "the pettifogging yearning for economy in little things which has ever distinguished the Post Office, and has caused the consideration to be irresistible that this system requires no separate transmitter batteries." The objection to this is on a par with the old sentiment which was responsible some years ago for the serious falling behind of British manufacturers, owing to their inability to introduce modern machinery in opposition to the strong sentiment which existed among the members of trades unions, who feared unreasonably that they would be permanently thrown out of employment. Mr. Bennett apparently thinks it a further evidence of pettifoggery that the Post Office has introduced "a system wherein one common battery suffices for all stations, so that the engineers are expected to evade the necessity of inspecting subscribers' instruments except at rare intervals, and so to keep down the staff of electricians." Another damaging consideration was that "with this system it is possible to crowd a greater number of subscribers in front of one operator, and keep down the operating expenses by compelling the girl to attend to as many as possible." It is only fair to Mr. Bennett to say that he announces that he would not deny the propriety of the last two reasons, provided he could be convinced that they are compatible with efficiency and are really economical.

To convince him, there is the rub! He is still harping on the idea of municipal ownership and the ring-through system, which brought disaster to Glasgow while the opponents to municipal ownership looked on with their cheeks behind their sleeves.

Surely the telephone business is one in which a man must keep up to date or be utterly lost.

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Telephone Companies vs. Abutting Owners

By A. H. McMillan.

RIGHTS OF URBAN ABUTTERS IN NEW YORK.

We wish to thank you for your answers to our questions in regard to the rights of urban abutters in New York, and for the information contained therein. (American Telephone Journal, Vol. 16, No. 2, page 23.)

We have investigated the references which you gave, and find that, in most instances, they refer to very early decisions—'84, '85, etc., on trial court decisions before one judge. We have recently had an opportunity of looking up the law on this question, and find several decisions of the Appellate Division of the Supreme Court, which are adverse to the opinion which you have given us. We respectfully refer you to the following:

Van Winkle vs. Van Winkle, 95 App. Div., 605, 89 N. Y. Supp. 26; Barhite vs. Home Tel. Co., 50 App. Div., 25, 63 N. Y. S., 659; City of Rochester vs. Tel. Co., 52 App. Div. 64 N. Y. S., 804; Castle vs. Bell Tel. Co., 49 App. Div. 437, 63 N. Y. S., 482; Johnson vs. N. Y. & Pa. Tel. & Tel. Co., 76 App. Div., 564, 78 N. Y. S., 598; New Union Tel. Co. vs. Marsh, 96 App. Div. 122, 89 N. Y. S., 79; Palmer vs. Larchmont Elec. Co., 158 N. Y. Reports, 231; 52 N. E., 1092; Eels vs. Am. Tel. & Tel. Co., 143 N. Y. Reports, 133, 38 N. E., 202; Osburn vs. Auburn Telep. Co., 97 N. Y. Supp., 874.

This latter case was referred to you in a previous issue under the heading of "Injury to Trees in New York State." From a careful perusal of these references, it seems to us that, so far as the decisions of the Appellate Division go, there can be no question but what a telephone company has a right to set poles in the streets of a city, or in an incorporated village, without obtaining the consent of the abutting property owners, even if the abutting property owners may own the fee to the center of the street.

In view of the recent decisions of the Appellate Division, we are not inclined to attach much weight to the decisions above referred to, but should like to know of a case of this character which has been decided by a Court of Appeals. We do not find that any of the cases cited above have been carried to the Court of Appeals, but it is our understanding that a case of this kind has been decided by the latter court, within the past year. We have been unable to locate this case.

We shall be very glad to have you continue your investigation with a view to citing a case of this kind, which has been decided by the Court of Appeals.

While it may be true that a telephone company has the right to set poles in the streets of a city without the consent of the property owners, it is very plain that this does not apply to highways outside of the corporation limits. It is evident that the consent of the property owners must be obtained in all such cases. Telephone.

THE editor is pleased to see what interest his answers to questions sometimes arouse. An examination of the above authorities cited by our correspondent has not caused him to change his mind concerning the law in regard to abutting owners of property in New York. Most of the cases cited in the above letter are cases holding that the right to occupy the streets and highways of the State with telephone lines and poles is derived from grant of the legislature, and not from grants of the municipalities in which the lines are erected. No case has been decided in the State that conclusively settles the rights of urban abutters. The status of the law is well expressed in the case of the New Union Telephone Co. vs. Marsh, above cited as follows:

"This right to the use of the street, however, is entirely independent of the question of the plaintiff's claim to compensation for any damages which have resulted to her property by the construction of defendant's line. There has been much discussion of this subject by the courts and no clear, well-defined rule seems to have been reached."

Several of the other cases cited are quite far from the point. For instance, Van Winkle vs. Van Winkle was not a telephone case at all, and it was there held that the fee to the center of the highway was presumed to be conveyed with the property, and was actually conveyed by the deed involved in the suit. Castle vs. Bell Telephone Co. involved underground wires and not a line in the streets. Palmer vs. Larchmont Electric Co. discusses electric light poles and not telephone poles, between which there might be quite a difference. Eels vs. American Telegraph & Telephone Co. held that abutting owners in country districts were entitled to compensation for damages. Although this case is sometimes considered as an authority for the proposition that abutting owners in cities would not be entitled to compensation, the gist of the decision, so far as urban abutters are concerned, is as follows:

"We do not decide as to that matter, nor do we intimate that the defendant would or would not have the right to place its poles in the city street without compensation to the owner if he owned to the center of the street."

It was upon the Eels' case, now supported by the very recent case of Powers vs. State Line Telephone Co., decided January 11, 1907, by the Appellate Division of the Supreme Court, that the legal editor based his answer to the questions in regard to the rights of urban abutters in New York. This latter case is separately referred to on this page.

RIGHTS OF MINNESOTA ABUTTING OWNERS.

We would like to know if you can give us any case where the court has been called upon to pass on the question of moving a telephone pole (in this particular case a stub) which is set on the street in front of a residence, and for which we have a permit from the city.

In the case we have in mind, there is a stub in front of a residence, which was set there in a legal manner, but which the owner of the residence wants moved from in front of his house to another location (in front of another person's property). We feel that we have a perfect right to be there, and as long as it does not interfere with anything but the looks of his property, that we should not have to move it, or if we do move it to accommodate him, that he should stand the expense of the move. We are asked to make moves similar to this a great many times, and would like to know the legal aspect of the case. C. C.

ACCORDING to your statement of the case, the legal editor thinks you are right in the location of the pole, and that you cannot be compelled to move it. This view is based upon the principle recognized by the Minnesota courts that a telephone pole upon a street does not constitute an additional burden to the abutting property.

The property owner appears to have no legal grounds for complaint that his interests will be damaged by such an act, and cannot compel the company to refrain from locating its poles there, neither can he demand compensation for permitting the company to exercise this privilege. This was decided in a very well resoned case in Minnesota, the opinion being returned by Judge Mitchell. Cates vs. Northwestern Telephone Co., 80 Minn., 539, 57 Am. St. Rep. 544, 64 N. W., 111, 28 L. R. A., 310.

ABUTTING OWNERS IN NEW YORK VILLAGES.

THE latest decision in the State of New York upon the question of the rights of abutters is Powers vs. State Line Telephone Company, decided by the Appellate Division of the Supreme Court. The court holds that a telephone company holding a franchise from an incorporated village, authorizing the placing of poles in the streets, cannot occupy land forming part of the street owned by the citizens and subject only to the assessments arising from a dedication of the streets, without the consent of the owner, and against his wishes, and without having acquired the right by condemnation. The plaintiff was the owner in fee of a portion of the street in front of his premises in Peekskill, a village of about one thousand inhabitants, the plaintiff's premises being near the extreme southern part of the village, and eighteen hundred feet from the business portion thereof.

The telephone company in this case was duly incorporated and held a franchise from the village. The suit was for the purpose of requiring the company to remove its poles and perpetually enjoining it from replacing them in that portion of the street. The court held that the village street was, to all intents and purposes, a country highway, although located within the village limits, and that the company therefore must abide by the rule governing such cases.

Said the Court: "While that court (the Court of Appeals in the Eels case) has determined that a different rule may exist and govern the rights of owners of the fee of streets in the village than is held applicable to the owners of the fee of country highways, it is not held that such different rule does exist." Powers vs. State Line Telephone Company, 102 N. Y. S., 34.

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Ways—Means—Reasons

LOADING COILS.—(907.)

A troubleman who visited our exchange recently, used the expression "loading" coils frequently in speaking of a common battery line. We would appreciate having you tell us what is meant by this term and uses for these coils and how they are connected to a line. G. R. A.

The troubleman was just a trifle at sea in the use of the term loading coils in connection with common battery work, as we know of no such coil used in this connection. He evidently had in mind Pupin coils, the object of which is to overcome the effect of capacity in long lines. As yet they have not been perfectly adapted to conditions prevailing in long open wire lines, but are used in a number of important trunk line cables, ranging from approximately 20 to in the neighborhood of 100 miles in length.

The coils are, in fact, double wound impedance coils of special design, a winding being connected in series with each side of the line.

TESTING TRUNK LINES.—(908.)

We have an exchange of three hundred lines in E———, and eighteen miles from here an exchange of fifty in M———. We have no trouble man or manager at M———, only the operator. Now whenever one of the lines between here and M——— gets in trouble I usually have to drive all the way over, as sometimes the trouble is on the line and sometimes in the board. If I knew the trouble was on the line I could send our lineman out to clear it, and if I was sure it was in the office I could take the train across and save half a day. Will you kindly tell me some simple manner in which I could determine the location of the trouble from the E——— end. By this I mean especially whether it is on the line or in the board, as it would not do me any good to know exactly where the trouble was on the line, as we have to go over it all until we find it anyhow. I have no bridge set for measuring. H. B. K.

From the description you give of conditions existing in your system it would appear that the most simple apparatus you could use for making the tests you desire would be an ordinary four or five bar bridging hand generator, of which you probably have several around your exchange.

When you again experience trouble on one of your lines, attach a pair of wires to your generator as shown at *J. K.*, Fig. 908. First it would be a good idea to make sure whether the trouble is in your own exchange or not. This you can do by attaching the generator wires *J. K.* to the binding posts *G. H.* of your lightning arrester after you have removed the fuses. A turn of the generator will determine the condition of your inside equipment. If the line drop falls everything is clear, but if it does not and the generator turns freely you have an open circuit, while a very hard turning of the generator denotes a short circuit.

After having found that the trouble is not in your exchange and you have cleaned your lightning arrester carbons thoroughly you can test out on the line by attaching *J. K.* to binding points *E. F.*

Again turning the generator will determine in the same manner as before whether the line is open or short circuited.

The next step will be to call your operator at M——— over the good line and tell her to remove the carbons from the lightning arrester of the line in trouble. If the line rings "clear" when this is done you have at once located the trouble in the carbons; however, if your generator still turns hard the trouble

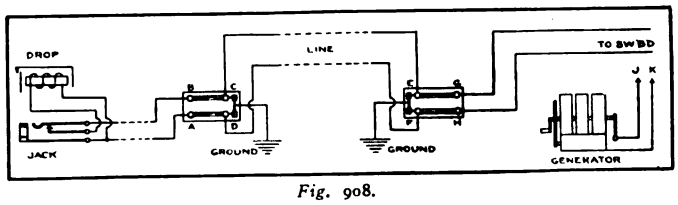

Fig. 908.

is at some other point. If it is an open circuit you are hunting for you can determine whether it is on the line or in the exchange by having your M——— operator place a piece of metal across the building posts *C. D.* Then if the generator turns hard you can bank on it that the line is O. K. and the open exists in the exchange, while if the generator turns lightly the line is open outside.

For locating a cross or short circuit have the operator remove the fuses and again make your test by turning the generator. If

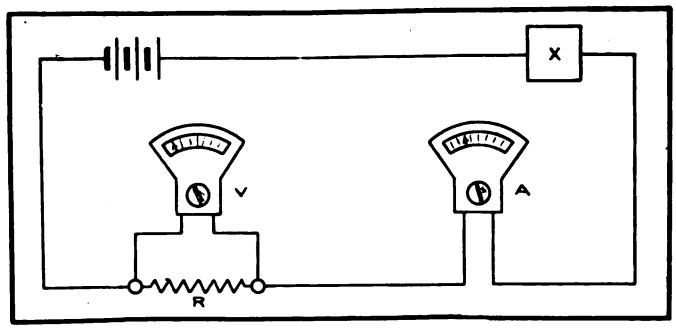

Fig. 909.

it still turns hard the trouble is on the line, but if it turns lightly you know at once that the "short" is at the exchange beyond the fuses. Tests may be made for grounds by connecting *J.* to ground and then touching *K.* first to *E.* and then to *F.* The side upon which *K.* is connected when the generator turns hard is the grounded one.

CALIBRATING AN AMMETER.—(909.)

Some time ago we purchased an ammeter for the purpose of keeping a record of the amount of current used in the operation of our exchange. Recently we have noticed that the indicator shows a greater amount of draw than we believe actually takes place. We believe that this is due to some one having run a larger amount of current through the instrument than it was built for and consequently they have unbalanced it. Will you kindly tell us how we may remedy this trouble without sending the instrument to the manufacturers? D. G. H.

A very convenient method of determining the accuracy of your ammeter would be by measuring the potential difference across a known resistance in the circuit. That is figuring the drop in potential when a given resistance is inserted. A circuit for calibrating your ammeter is shown in Fig. 909. In this circuit an ammeter *A*, a variable resistance *X* and a known resistance *R* are in series with a source of power which is represented by the three cells of battery. The standard voltmeter *V*, which you must be sure is absolutely correct, is connected across the terminals of the known resistance *R*. Then going back to Ohm's law and considering the equation $I = \frac{E}{R}$ we find that by dividing the volt ammeter reading by the value of *R*, we have the strength of the current, which when compared with the reading of the ammeter shows the error immediately. This is a very simple test and can be made readily by anyone having a voltmeter of which he is absolutely certain as to calibration.

You state that your ammeter indicates a larger consumption of current than you think actually takes place. It may be that you have at some place a leak which has not as yet made itself apparent, and we would suggest that you make certain that this is not the case before attempting to adjust your ammeter.

COLLECTING RURAL RENTALS.—(910.)

What is the best and most economical system of collecting for a country telephone system of 300 to 500 subscribers? Is there any better way than to send a man over the territory quarterly? Our line goes over such hilly country that it is slow work collecting this way. How much should a collector be paid, he to furnish his own horse and rig and the telephone company to pay for meals and horse feed while on the road collecting?

What compensation should the secretary of such a company receive for his services per year? H. J. B., Penna.

Questions of this nature are frequently received, and the editor would very much like to hear from the managers of other companies who have adopted a method of collection that works out well on an economical basis. The best of these suggestions will be published in the columns of THE AMERICAN TELEPHONE JOURNAL in the order of their receipt.

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WANTED—Young Telephone Engineer desires position as Manager of an Exchange from 500 to 3,000 subscribers. Capable of handling the business as well as electrical end. Six years' experience in all branches of telephone work. Technical graduate. Address Box 905, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 905

WANTED—Position as inspector on toll or farmer lines or small exchanges. Have six years' experience on line instruments and switchboard work. Best of references. Address Box 906, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 906

CABLE SPLICER wishes position. Constructing new plants. Remodelling old plants. Locating trouble. Repairing and overhauling. Address Box 907, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 907

WANTED—A position as manager or superintendent of construction by man of sixteen years' experience, eight years on construction, two on switchboards and instruments, two as local manager, and four as district manager. Best references and can furnish bonds, know how to handle men and money. Thirty-three years old and married. Address Box 911, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 911

COMPETENT switchboard and construction man has few months between positions during which period he will install or overhaul central office equipment. Permanent position not desired. Address Box 909, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 909

POSITION wanted in Central States by traffic expert (employed). E. E. Degree Cornell 1900, Assoc. A. I. E. E. Seven years' experience in handling local and suburban traffic and organizing forces for magneto and common battery offices. Address Box 914, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 914

WANTED---Continued

WANTED—Permanent position by telephone man experienced, as manager or electrician. Capable of giving good service to subscribers and dividends to stockholders. References. Four years last position. Use neither liquor nor tobacco in any form. E. J. Pitrat, 210 S. Grove St., Urbana, Ill. 910

WANTED—Two trouble men. Wages $2.50 per day. Common battery work. No beginners wanted. Address Galesburg, Union Telephone Company, Galesburg, Ill. 913

WANTED—A wire chief. Must be a man capable of taking care of a plant of 4,000 telephones. Give experience and wages asked. Address Box 912, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 912

POSITION—Wanted by young married man 25 years, 6 years' experience on all kinds of instruments, lines, nickel automatic P. B. X. Now employed on same as repairman. Best references. Address Box 915, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 915

INDEPENDENT telephone solicitor wishes position with Independent company at once. Four years' experience. Best of references. Address Box 908, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 908

WANTED—Position with telephone company east or central west. Fifteen years' experience as general foreman of construction and maintenance of lines. Address, Box 901, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 901

WANTED—Position in Engineering Department by experienced man familiar with modern methods in exchange cable and pole line construction. Best of references. Address Box 904, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 904

WANTED—Position with telephone company as superintendent or manager by married man; 10 years' experience in telephone work. Good on instruments, switchboard and construction. Desires to make change. Good reference. Address Box 865, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 865

CABLE SPLICERS furnished, familiar with both telephone and electric, all with at least five years' experience. Address Box 895, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 895

OFFERS.

OFFERS addressed to the undersigned will be received up to noon on Monday, the 16th day of September, 1907, for the furnishing of such telephone equipment and construction material as will be required from time to time in country exchanges to be built in the Province of Manitoba.

Detailed information including specifications may be had upon application. J. H. Howden, Minister of Railways, Telephones and Telegraphs, Winnipeg, Manitoba, Canada. 903

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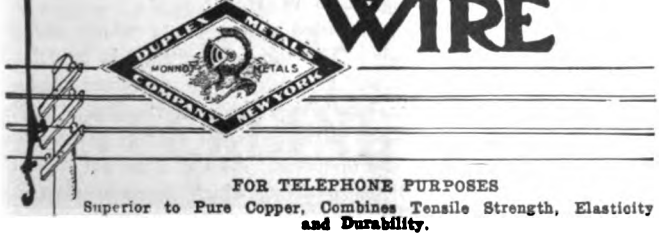

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Recent Telephonic Patents

CABLE TERMINAL.

F. B. Cook, Chicago, patent 862,542, Aug. 6, 1907.

The cable terminal described in this patent comprises a circular base plate with flat protector strips mounted vertically upon it. Supporting brackets are secured to the lower side of the base plate and adapted to fit around and be secured to the pole top. Insulators are fastened to the under side of the base plate for the drop conductors.

Individual protector units are adapted to be mounted singly on the protector strip. A metallic casing which may be raised or lowered at will to afford access to the interior is provided.

SIGNALING SYSTEM.

H. M. Eldred, Milwaukee, Wis., patent 863,705, August 20, 1907.

In the signaling system described in this patent each subscriber's station is provided with a push button. Upon the actuation of this push button, by the subscriber, when a connection is desired, there is cut in series to ground one side of the line, the subscriber's line signal and a constantly driven generator located at the central office. The function of this generator is to supply power for the operation of the subscriber's line signal and the signaling of called subscribers.

COMBINED TRANSMITTER AND RECEIVER.

R. F. Ludlow, Philadelphia, Pa., patent 863,617, August 20, 1907.

This patent describes a retaining case containing a pair of electromagnets, a carbon resistance chamber and a single diaphragm. The diaphragm is adapted to be actuated either upon energization of the electromagnets, or the impinging thereon of sound waves during speech transmission.

RELAY.

F. R. McBerty, New Rochelle, N. Y., patent 862,580, August 6, 1907.

The relay described in this patent is one in which an extension of one pole piece serves as a seat for the relay armature. In this pole piece is inserted a screw having an unthreaded end portion which passes through the relay armature, providing a means of adjustment for the armature and a guard against the armature becoming "unseated."

INTERFERENCE DETECTOR.

A. H. Berg, Clarkfield, Minn., patent 859,909, July 16, 1907.

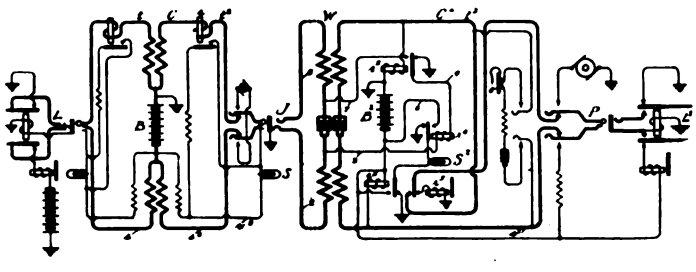
An arrangement of a bell gong, a supporting section and springs, together with a toothed bar attached to the receiver hook is described. The latter is so placed as to actuate the springs and sound the gong a predetermined number of times upon the removal of the receiver from its hook.

The object of the device is to acquaint persons conversing on a party line with the identity of an instrument at which a third person attempts to listen.

TRUNK CIRCUIT.

C. S. Winston, Chicago, patent 863,338, August 13, 1907, assigned to K. S. S. Co.

The trunk circuit described in this patent is one of the type for connecting two wire and three wire exchanges. C, C^2 repre-



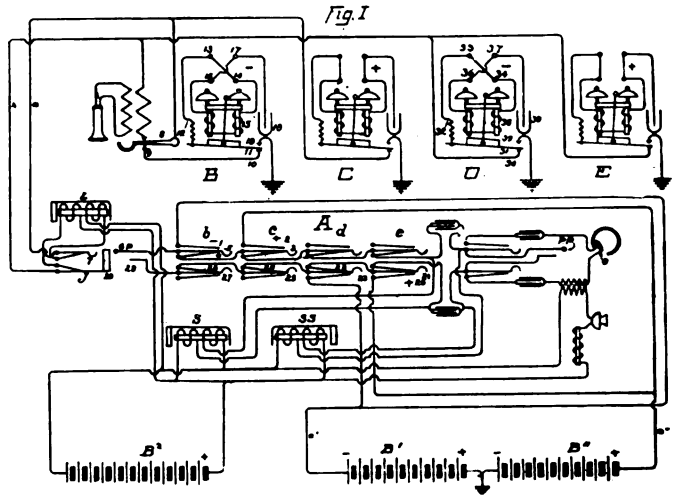
sent the three and two wire exchanges respectively, having connected to them instruments L, L^2. The insertion of the plug of the subscribers' operator's cord in the jack J of the trunk causes the actuation of relay r^4 lighting lamp S^2, which notifies the operator at the two wire station that connection is desired. The plug P is then inserted in the proper multiple jack and the desired subscriber is rung. When this subscriber answers a circuit is closed through relay r^3, which operates relay r, thus shunting out the supervisory signal S. Upon the termination of the message the reverse action takes place.

SELECTIVE SIGNALING SYSTEM.

W. W. Kidney, Buffalo, N. Y., patent 863,924, August 20, 1907, assigned to Century Tel. Const. Co.

The selective system of signaling described in this patent comprises one in which a source of direct current is utilized for

Fig. 1



ringing purposes. Batteries B,' B," are connected with opposite poles to ground, and are connected to the ringing keys b, c, d, e, in such a manner that by pressing the respective buttons a direct current of a predetermined polarity is caused to flow upon the line to the instruments. Ringers are of the polarized type, the armature having a contact spring attached on the vibratory make and break principle. When current is sent out on the line the condenser 18 is charged, and the pole of the proper polarity is energized, giving one stroke. The contact point then leaves the point 10, and presses against the grounded contact, thus discharging the condenser, and allowing the armature, with the aid of the coiled spring 12, to return to its normal position. when the contact spring 11 again comes in connection with the contact point 10, and the action is repeated.

CABLE TERMINAL.

F. B. Cook, Chicago, patent 862,543, Aug. 6, 1907.

The cable terminal covered by this patent is constructed entirely of sheet metal. Its parts are arranged much like those in the terminal described in Patent 862,542 granted Mr. Cook. Provision is made, however, to mount this terminal upon the side of the pole, while the other was arranged for mounting upon the top.

PAY-STATION.

H. B. Holmes, Park Ridge, Ill., and E. B. Craft, Chicago, patent 862,334, Aug. 6, 1907; assigned to W. E. Co.

In this coin collector is provided a coin chute which delivers the coin upon a guide rail. The top of the coin is held by a grooved arm attached to the armature of a polarized magnet, adapted to throw the coin into either the coin receptacle or the refund box, according to the direction of a special current impressed upon the line by the operator. As the coins are directed into the cash box they pass over a dog which closes an electrical circuit a determined number of times, thus signaling to the operator the denomination of the coin deposited.

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The Telepost Company owns all the rights and patents of the Delany System of Rapid Automatic Telegraphy. After a successful, practical demonstration over a broad circuit in actual work, covering a long period, this system is now commercially perfected.

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News from the Factories

A NEW TERMINAL BOX FOR INTERIOR WIRING.

TERMINAL boxes for facilitating maintenance work, and providing for an economical and flexible local distribution scheme are a necessity in all modern buildings, where from three or four to a hundred or more telephones are used on each floor. The essential features of a satisfactory terminal box are still in dispute in some quarters, as it has been found that if poorly constructed various troubles are introduced, and the box becomes more of a nuisance than an aid to maintenance men.

After a study of the demands made upon this type of equipment the American Electric Fuse Company, of Muskegon, Mich., has put upon the market a new terminal box. It is made in three sizes, 10, 15 and 25 pair, and is for use on floors of buildings where ten or more telephones are to be used. It can be used for a branch exchange terminal or in any place where ten or more lines need to be connected through a single box inside of a building where protection against foreign currents is not essential.

Solder clips to which the cable wires are fastened are made of German silver set in hard rubber. Guide wire strips and lock nut terminal strips are of thoroughly seasoned maple boiled in linseed oil. Where the service wires run out, lock nut posts are provided with three extra heavy nuts. The covering is made of golden oak, finished in two coats of the best varnish, and is equipped with heavy brass hinges and a bronze catch. This box is known as the "American" type "L."

Circulars, prices, or a more complete description will be furnished by the American Electric Fuse Company either from its factory at Muskegon, Mich., or from its New York City branch, 116 Nassau street.

CANADIAN INDEPENDENT TELEPHONE CO., LTD., Toronto, Canada, has recently been chartered by the Canadian Government with an authorized capital of $5,000,000. The company intends to manufacture a full line of automatic and magneto telephone apparatus. This company has close relations with the Canadian Machine Telephone Co., Ltd., of Toronto, which owns the Lorimer automatic telephone patents for Canada. Plans have been made for a factory which the company proposes to erect at once. Mr. W. A. Wood of Wood, Vallance & Co., Hamilton, Ont., is president of the company, and a number of well known Canadian business men are included in the board of directors.

THE F. BISSELL COMPANY, 233 Huron street, Toledo, O., sells a very complete line of John R. Fletcher's malleable iron telephone brackets. These are adapted to almost every conceivable type of location encountered in telephone work. Special designs have been made for driving into cement between bricks, fastening to corners on flat walls, etc. Other varieties are provided with expansion bolt bases or lag screws. Interested persons may obtain folders showing illustrations of each of these classes of brackets, as well as prices, by writing to the company.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, reports a constantly increasing demand for its transmitters and receivers to be used for transmitting church services, concerts, lectures, phonograph music, etc., over telephone lines.

W. N. MATTHEWS & BRO., 209 North Second street, St. Louis, Mo., have recently issued a leaflet showing a method of using the Kearney cable clamp to save time and labor. The statements on this card go into detail, and show the saving that the company claims can be effected in dollars and cents. Interested persons can obtain these statements by writing to the company.

FIBRE CONDUIT COMPANY, Orangeburg, N. Y., has issued a sixty page book which gives a lot of first rate information about conduits and conduit laying. Practically every class of work is taken up and valuable information furnished, while some of the illustrations are fully as useful as the text which accompanies them. Taken altogether, it is one of the most attractive and informing books issued by any manufacturer connected with telephone interests, and should be in the office of every manager and superintendent of construction.

DURANT ELECTRIC SUPPLIES COMPANY, 52 Fifth avenue, Chicago, Ill., advertises some interesting features in the way of construction specialties. The company is developing a considerable business in metal and oak brackets and offers for sale Krekose "treated" pins, which it strongly recommends as superior to ordinary oak and locust pins both in respect to strength and durability. Full information, prices, etc., can be obtained from the company.

COPPER GOSSIP, published by the National Conduit & Cable Company, 41 Park Row, New York, gives the latest news concerning the copper market and prices, both exports and imports and European statistics. Each monthly issue of this paper may be obtained free of charge by writing to the company.

THE STROMBERG-CARLSON SELF-RESTORING GRAVITY DROP.

BY securing all the parts of a new self-restoring drop in the proper relation to one another independently of the supporting, or mounting plate, the engineers of the Stromberg-Carlson Tel. Mfg. Co. believe that they have produced a piece of apparatus which will present some very practical advantages from the operating standpoint. The ingenious mechanical arrangements necessary to attain this end embrace the production of comparatively few parts of peculiar shapes, formed of soft drawn steel, with the exception of the indicator, which is made of aluminum.

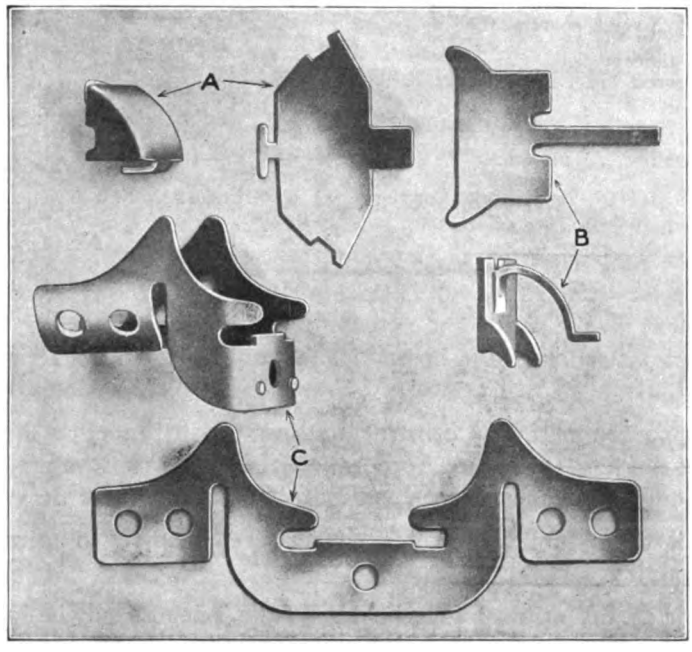

Fig. 1. Shutter and other parts which enter into the construction of the Stromberg-Carlson self-restoring drop.

The small parts entering into the drop are shown in Fig. 1, which gives an idea of the shape of the original flat punchings, as well as of each of the finished sections of the drop.

The shutter *B*, made of soft steel, carries an indicator *A* which is formed preferably in the shape of a part of a cylinder with closed ends; that is, the surfaces exposed to view when the indicator is dropped are a curved cylindrical surface and two plane surfaces, one at either end of the indicator. Aluminum was

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PROFIT OR LOSS

In the operation of toll line service is often dependent upon the whim of the operator timing the toll messages, unless she is equipped with a

CALCULAGRAPH

The operator can display no favoritism in timing a message when the Calculagraph is used.

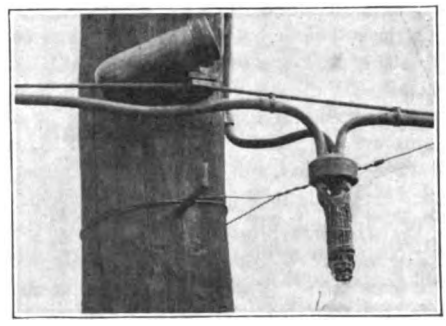
Every second of overtime on the message is accounted for and losses in charges usually experienced are eliminated.

Our Booklets Tell Why
Write for Them To-day

CALCULAGRAPH COMPANY

1437 JEWELERS BLDG., NEW YORK CITY

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.



MAKING TESTS IN TELEPHONE CABLES

WHERE HARGIS JOINTS ARE USED

Take your pair of spanners, unscrew the pot from the ring, unlace the pairs and spread them out like a fan. You can then test any of the pairs with greater ease than you can test pairs on the outside layer of a Horizontal Wiped Joint. When test or repair is finished, all that you have to do is to screw the pot on to the ring and tighten with a pair of spanners, and you have a perfect moisture-proof joint. It is not necessary to drag the cable platform, block and tackle, below torch, etc., from one joint to another.

The expense of a groundman can be eliminated when looking for trouble or making tests when Hargis Joints are used. These are only a few reasons which demonstrate the advantages of the Hargis Cable Splicing Joint.

If you are considering new cable construction or wish to change your Horizontal Wiped Joints to Hargis Joints, on account of their convenience, write us to-day. You will save time and money. You will improve your cable construction.

W. N. MATTHEWS & BROTHER

Manufacturers of Patented Specialties

214 N. 2d St., St. Louis, Mo.

Branches: New York, San Francisco

Those Tracings of Yours

ARE VALUABLE. DON'T WEAR THEM OUT BY CONSTANT USE.

¶ Have Blue Prints made of them. The cost won't be great.

¶ We do the highest grade of Blue Printing. Do it on the jump, too.

¶ Send us those tracings. We will make the prints and mail both tracings and prints to you the same day the tracings are received by us.

¶ Further than that, we will guarantee the tracings will be returned to you in exactly the same condition they are received by us.

¶ And again—we can save you REAL money on Tracing Paper, Blue Print Paper, and Tracing Cloth.

¶ Better get in line and send us that order now.

(By special permission we refer to "American Telephone Journal.")

H. B. CHRISTENSEN CO., Inc.,

For Thirty Years at

33 MURRAY STREET, NEW YORK

Our Method of Preserving Poles and Cross Arms

consists of deeply penetrating them with a self impregnating liquid of heavy specific gravity, which on account of its antiseptic ingredients, will effectually prevent rot, dry rot, and decay.

We guarantee that a proper application of

AVENARIUS CARBOLINEUM

(REGISTERED)

will add tensile strength and

DOUBLE THE LIFE of POLES

You not only save the intrinsic value of the wood, but also avoid loss of time, labor and trouble caused by renewals.

Just the thing for your telephone poles.

Write for Literature

CARBOLINEUM WOOD PRESERVING CO.

MILWAUKEE WISCONSIN

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News from the Factories

selected for the indicator because of its marked contrast with the usual dull black surfaces of the switchboard.

The bracket *C* is the main punching which is properly formed to support the armature, the shutter, the indicator and the thimble. This bracket is secured to the shell through insulations by two screws on either side. Openings to admit the mounting screws are elongated to permit the adjustment of the bracket relatively to the shell, by which means the armature may be caused to occupy the proper position relative to the shell core of the coil.

The raised points shown on the front of the formed bracket fit into recesses in the face plate to prevent any chance of the drop twisting after being mounted on the plate.

In the illustration (Fig. 4) showing five drops on a strip, the prominence with which the indicator of an actuated drop stands forth is very noticeable. The indicator is plainly visible from different directions and so constructed as to display a plurality of differently exposed surfaces so that one or more surfaces shall always be prominently in view, regardless of the position of the operator. Night bell contacts are independently mounted on the upper surface of the mounting strip.

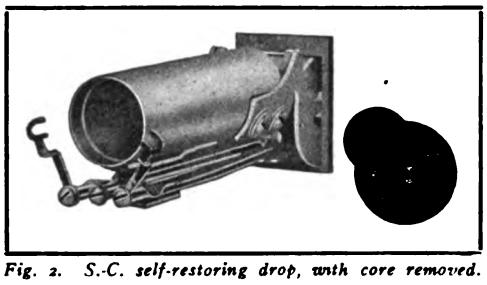


Fig. 2. S.-C. self-restoring drop, with core removed.

In other accompanying views the coil, with the core intact, is shown removed. This is a type of construction which the company states gives very high efficiency, and it is likewise the most simple to manufacture.

The effect of the combination of these parts is to provide a self-restoring gravity drop capable of being wholly assembled before it is mounted. All the necessary adjustments can be made beforehand, which also expedites and simplifies the process of mounting as well as eliminating the liability of throwing the parts out of adjustment during the process of mounting.

The Stromberg-Carlson Tel. Mfg. Co. is furnishing this form of drop with a new form of generator call switchboard cabinet.

Davis Telephone Rate Adjusting Company, 708 Electric Building, Cleveland, O., gives some good points on soliciting and rate adjusting in a circular which has just been published. It may be obtained by writing to the company.

Anderson Forge & Machine Company, Detroit, Mich., manufactures a number of interesting specialties for use in telephone construction. Full descriptions of these may be obtained upon request.

Page & Hill Co., Minneapolis, Minn., have recently published a complete price list of all standard poles, included in a book which contains much information of general interest to pole users, and a telegraph code for ordering.

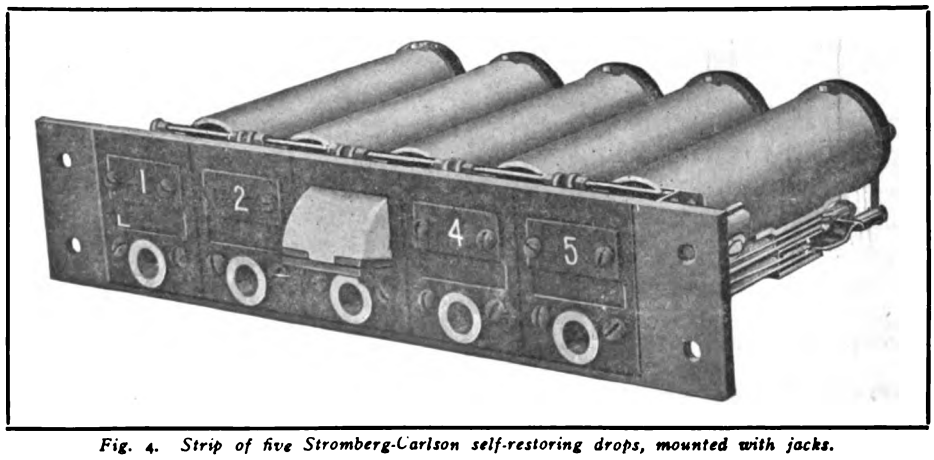
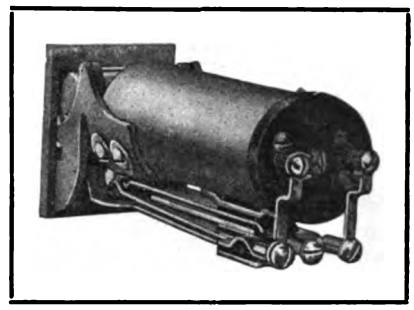


Fig. 4. Strip of five Stromberg-Carlson self-restoring drops, mounted with jacks.

Long Distance Tel. Mfg. Co., South Bend, Ind., has printed some interesting information for users of its telephones, transmitters, receivers, etc. These opinions from practical men are being distributed by the company and can be obtained by interested persons who are looking up this class of equipment.

Mountain State Electrical Company, Wheeling, W. Va., manufacturers of the 'No-key Electric Clock" is prepared to furnish some interesting reasons why this clock will give exceptionally satisfactory service to telephone exchange managers. When this clock is used, there is no such thing as missing an appointment because somebody forgets to wind it.



Rear View of S.-C. Self-restoring Drop with Associated Jack.

Wire & Telephone Company of America, Rome, N. Y., reports that the introduction of the "Easophone" as an extension set has led to the use of the telephone in many new locations in residences, etc., where it is especially desirable that an instrument of inconspicuous form shall be installed. The company has some interesting facts on the use of this instrument as an extension set ready for distribution, and they will be furnished to interested exchange managers.

Sterling Electric Company, Lafayette, Ind., has prepared some interesting information about cable terminals of different types. This company manufactures protective apparatus for central offices and outside work. It will be pleased to send information concerning its can top terminals with removable units, especially adapted to economical multiple tap distribution, to all interested persons.

The Century Telephone Construction Company, Buffalo, N. Y., reports that operating companies are expressing themselves as well satisfied with the No. 85 desk telephone, which has now been on the market for some time. A striking feature of this set is the extreme accessibility of the springs associated with hook contacts, as they may be reached by simply twisting a knurled head and removing the two sides of the split handle. These two sides normally come together with a joint so mechanically perfect that practically no seam is evident.

L. M. Ericsson Tel. Mfg. Co., Buffalo, N. Y., announces that the type of repeating coil which it designates by the name "Duplex Transformer" is particularly adapted to phantom line work. It makes especially strong claims for the efficiency of this coil in transmitting both ringing and talking currents.

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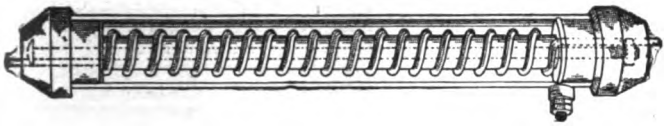
SKY ROCKET ARRESTERS Protect Lines



In the Sky Rocket Arrester a 50-inch length of wire is built up into a succession of coils around a porcelain tube thus having a choking or reactance effect, and is surrounded by an iron cylinder to which is attached the ground wire.

When current of excessive notential, such as lightning, strikes the line wire it will not travel over this succession of coils into the telephone or switchboard. Instead it chooses the shorter path to ground, which is obtained by leaping the minute air gap between the discharge points of the wire helix and the grounded iron cylinder.

Another quotation of an authority on protective apparatus:

"The Line Protector has the function of protecting wooden poles from shattering by direct stroke of cloud lightning. It also has the possibility of carrying a direct stroke of cloud lightning to ground past the line wires without shattering the insulators or causing a short circuit."

Sky Rocket Arresters are placed on the line where they can protect to the best advantage line, poles and apparatus. The cost is low and THEY ALWAYS PROTECT

Write To-day for Sample

Chance Manufacturing Co.

Centralia Missouri

N. B.—The names of engineers quoted in this series of advertisements will be given on application.

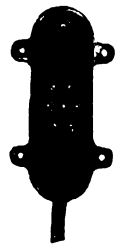
Equipment No. 102

Easophones

The WIRE & TELEPHONE COMPANY of AMERICA ROME, N.Y.

FOR MAGNETO and CENTRAL ENERGY SERVICE

IDEAL FOR HOMES, OFFICES, HOTELS, FACTORIES.



Rear View Switch Box

The switchhook box, as illustrated, is stamped from sheet steel, and is provided with flanges for mounting. The box is finished either in nickel or black enamel, and is very attractive in appearance. A single metal stamped bracket is provided for supporting and holding in fixed position the actuating mechanism. The spring connecting plates and the hook and working parts are held in place within the box by a single screw, and all parts may be readily removed. By the use of inturned contact springs acting upon the hard rubber roll placed upon the supporting or actuating hook, the use of axiliary springs is made unnecessary. All contact springs are provided with platinum points. An insulating plate with brass lugs molded upon it is provided for direct connection to the flexible silk connector cord. Stamped springs and plates provide all necessary means of connection, and there is thus afforded the necessary direct connection for any telephone circuit. The construction of all parts is of such a substantial character as to reduce the chances for trouble to a minimum.

Read our adv. of Aug. 3rd, 10th, 17th, 24th and Sept. 7th, and write for Bulletins No. 101 and 102.

The Wire & Telephone Company of America

ROME, N. Y.

Mfrs. Telephones and Supplies, Including Wire

PROBLEM:

Jones owns an exchange into which a party line enters. One subscriber, "A," wishes to call central without the knowledge of his neighbors. Jones would like to accommodate him, but objects to the expense necessary for push buttons, commutators and rewiring at the subscribers' stations and switchboard. How can Jones avoid it?

SOLUTION:

Give "A" a LONG DISTANCE Bridging Telephone. It calls central secretly without additional expense or trouble for rewiring, push buttons, commutators, etc. No change in other subscribers' stations or at central is required; no extra charge for the 'phone. Ask for Bulletin "B."

LONG DISTANCE

TELEPHONE MFG. COMPANY

SOUTH BEND, INDIANA

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Brief Notes of Progress.

NEW COMPANIES.

BEL AIR, MD.—The Susquehanna Pole Line Company of Hartford County has been incorporated with a capital stock of $50,000 for the purpose of constructing, owning and operating telephone and telegraph lines and for the transmission of any business in which electricity either over or through the wires may be applied to any useful purpose, and especially to operate and lease pole lines. The incorporators are H. Clay Whitford, J. Alexis Shriver, Alexander S. Bell, O. M. Whitaker and Joseph T. Deckman.

WILLOW SPRINGS, MO.—The Willow Springs Local and Long Distance Telephone Company has been incorporated with a capital stock of $50,000. The following officers have been elected: President, H. J. Rowe; vice-president, T. F. Muir; secretary and treasurer, George H. McClain; manager, W. N. Wicks.

CARSON CITY, NEV.—J. F. Adams and associates have organized a telephone company, capitalized at $250,000, to operate lines running from Carson to Tonopah and adjacent camps. The company has already secured control of all lines extending from Carson, Minden, Bridgeport, Sweetwater, Gardnerville, and is contemplating the still further extension of its system.

GRACEMONT, OKLA.—Articles of incorporation have been filed by the Spring Creek and Anadarko Telephone Company. The capital stock is given at $1,000, and the incorporators are J. F. Prewitt, A. M. Pickett, C. A. Robinson and H. H. Timkin, of Gracemont, and John Colp, of Anadarko.

LOUIS, OKLA.—The Louis Farmers' Co-operative Telephone Company has been incorporated with a capital stock of $2,000. The incorporators are C. J. Johnson, J. D. Sanders, B. F. Waller, J. L. Sanders, of Louis, and H. T. Morguis, of Hollis.

JONESBORO, TENN.—The Locust Mount Telephone Company, of Locust Mount, Washington County (P. O. address, Jonesboro, Tenn.), has been incorporated with a capital stock of $5,000. The incorporators are S. T. Martin, R. A. Walker, Jesse Hunt, Dr. George C. Horn and J. H. Hale.

BRANCHVILLE, VA.—The Union Telephone Company of Branchville has been incorporated with a capital stock of $2,500. The following officers have been elected: W. R. Sykes, Branchville, secretary; W. W. White, Boykins; C. B. Vick, J. G. Stancill, J. V. Rogers, Branchville, directors.

LANSING, WEST VA.—The Lansing Telephone Company has been incorporated with a capital stock of $5,000, and the following are among the incorporators: D. B. Crawford, J. H. Nickel, W. R. Dickerson, N. Crawford and R. R. Crawford. The company is already operating telephone lines in Mt. Cove district, and it expects to extend its system throughout that district and into Nicholas county.

FRANCHISES.

RANTOUL, ILL.—Coon Brothers, of this city, have made application to the city council for a franchise permitting them to construct and operate a system of telephones within the corporate limits of the city, which will continue in force for a period of twenty-five years.

JEFFERSONVILLE, KY.—The Jeffersonville Independent Telephone Company expects to apply for a franchise at this city. If it is granted the company pledges itself to begin work on an exchange within six months from the time of the granting of the franchise. This organization was formed about eighteen months ago, with Jacob Eberts as president.

CARSON CITY, NEV.—At a recent meeting of the city trustees the terms of the franchise to be granted to the Nevada Consolidated Telephone & Telegraph Company were agreed upon. The company, which already has lines to Minden, Gardnerville, Markleville and Loope, expects to give the people of Carson City a strictly up-to-date service, and intends also to build lines to Yerington and Masonic.

BERLIN, N. H.—A franchise has been granted to the Essex & Coos Telephone Company to establish a telephone system in this city. It was granted upon the recommendation of the Vermont and New Hampshire Independent Telephone Association.

SALEM, ORE.—The Northwest Long Distance Telephone Company, which is affiliated with the Home Telephone Company, has been notified by the Mayor of Salem that it will not be permitted to conduct a long distance telephone service in the city of Salem excepting under a regular franchise, granted by ordinance of the city council. Application for such an ordinance will be filed before the next meeting of the council.

PIERRE, S. D.—The Great Western Telephone Company has made application for a franchise in this city. It proposes to install a local exchange to be operated in competition with the Dakota Central (Bell) Company. A reduction in rates is promised by the new company.

CHENEY, WASH.—W. T. DuBoise, of this city, has recently been granted a franchise by the city council permitting him to construct, reconstruct, operate and maintain a system of telephones at this place. Mr. DuBoise has disposed of his stock business and will devote his entire time to the construction and operation of the telephone system.

FINANCIAL.

COLUMBIA, S. C.—Many protests are being laid before the State Board of Railroad Assessors by telephone companies on account of the amounts for which they have been assessed by the board. The following companies have protested against the amounts given: Laurens Telephone Company, $5,000; Home Telephone Company of Georgetown, $16,000; Chesterfield Telephone Company, $2,100; Batesburg Telephone Company, $2,000; Southern Bell Telephone Company, $727,000, and the American Bell Telephone Company, $425,000.

HOUSTON TEXAS.—The Automatic Telephone Company has filed with the city of Houston an indemnity bond for $1,000 covering any damage the company may do the city streets while installing its system. A second bond will be filed within sixty days for $2,500 as a surety that the system will be completed within the time specified in the granting of installation permissions.

BROADHEAD, WIS.—The Broadhead Telephone Company has declared its first annual dividend. The company shows a marked growth in the last year and many extensions are contemplated for the coming season.

ELECTIONS.

ROCKVILLE, IND.—At the annual meeting of the Parke County Telephone Company the following officers and directors were elected: A. M. Adams, president; L. N. Whitney, vice-president; C. L. MacNaughton, secretary and treasurer; Mr. Upritchard, auditor.

MANKATO, MINN.—The officers of the Mankato Telephone Company are: E. A. Patterson, president; N. Peterson, vice president; W. D. Willard, secretary; W. A. Funk, attorney.

ROSWELL, N. M.—The officers of the Roosevelt County Telephone Company are: C. E. Lukens, president; S. L. Ogle, vice president; C. E. Harris, general manager. Directors: H. Fitzgerald, W. E. Lindsey and E. Massie.

GRANVILLE, N. Y.—At the annual meeting of the Granville Telephone Company held recently, the following directors were elected: F. E. Hicks, F. T. Pember, J. N. Kelly, F. W. Story, E. D. Raymond, John O'Neill, J. H. Collins, W. A. Tenny, D. D. Woodward, E. J. Grady, F. A. Houston, Dr. M. G. Parker, M. B. Jones, Ellis Greenleaf and C T. Keller.

VICTORIA, B. C.—At the annual election of the Fort Seneca Mutual Telephone Company the following officers were elected: President, L. C. Umsted; vice president, W. C. Rosenberger; secretary, L. S. Edwards; treasurer, Frank Edwards.

COMBINATIONS.

SUN PRAIRIE, WIS.—The Fox River Valley Telephone & Telegraph Company has acquired the plant formerly owned and operated by the Wolf River Telephone Company. This was brought about by the sale of the Inter-Urban Company of Sun Prairie which had prevously absorbed the property and franchises of the Wolf River Telephone Company, to the Fox River Valley Company, and the payment by the latter of a balance of $3,755.54 to John F. Kluwm, receiver of the Wolf River company.

MISCELLANEOUS.

NEVADA CITY, COLO.—The U. S. Forest Commission will build telephone lines to connect Squaw Valley, Truckee, Tahoe Tavern, Truckee Camp and Robinson's Flat. Address all communications to Supervisor Elliot, Forest Rangers, Nevada City.

HIGHLAND, ILL.—The Farmers' and Merchants' Telephone Company has recently changed hands and is now owned by Philip Baer, S. Jacob; C. T. Pabst, Michael Matter, A. P. Mosiman, L. O. Kuhen, H. J. Buchheim and J. N. Stokes of Highland. Address A. P. Mosiman, President.

KOKOMO, INDIANA.—In a controversy between the Citizens' Telephone Company and the city of Kokomo relative to an increase in the toll rate to rural subscribers of five cents per message, the telephone company signified its willingness to meet with a special committee appointed by the city

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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National Pole Company

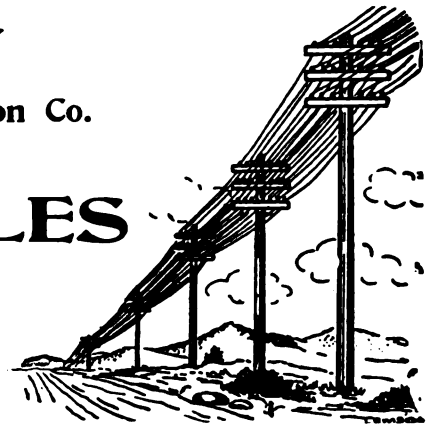
SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from
Maine to Washington



CROSS ARMS

LONG LEAF YELLOW PINE

All Heart, Special Sizes, Plain Painted
or Creosoted. Large Stocks,
Quick Shipments.

LEWIS LUMBER & MFG. CO.,

Hattiesburg, Miss.

INTERNATIONAL TRANSMITTERS

EVERY ONE WORKS

Guaranteed to give a loud, clear tone and DON'T fry, sizzle, pack or go dead.

Built to Fit Any Style Arm

We Make a Full Line of Telephone Apparatus

Send for Catalog

INTERNATIONAL Telephone Mfg. Co.

Harrison and Clinton Sts.,
Chicago, U. S. A.

YARDS:
ESCANABA
WILSON
DAGGETT
REED CITY

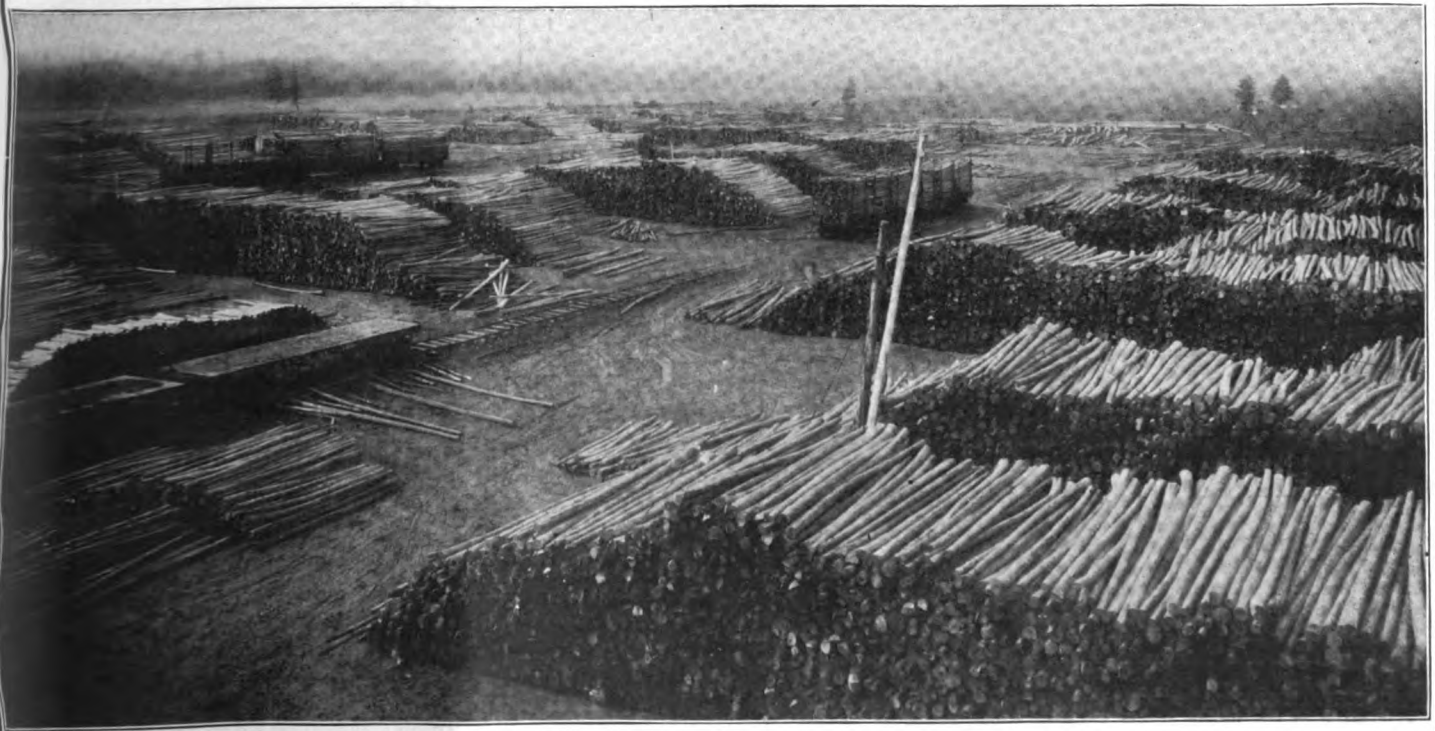
Kellogg Switch-Board & Supply Co.

CHICAGO, ILL.

WHITE CEDAR POLES

DOESN'T THIS LOOK LIKE PROMPT SHIPMENTS FROM STOCK?

BRANCH OFFICES:
PHILADELPHIA
CLEVELAND
KANSAS CITY
LOS ANGELES
ATLANTA
WINNIPEG



VIEW OF OUR YARDS AT ESCANABA, MICH, TAKEN JULY 1ST, 1907—To keep our loading gangs busy during the dull summer months we are naming very attractive prices. Write us for delivered prices. We also handle chestnut and western red cedar.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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Brief Notes of Progress

council and thoroughly discuss the situation. This committee was appointed but refused to enter into a discussion or make a report on the matter, as the franchise under which the telephone company is operating was granted by the Board of County Commissioners, and matters appertaining to it are therefore not the business of the city.

MORRISON, IOWA.—The telephone service in Morrison, Clinton and Sterling was damaged somewhat by a recent electrical storm which swept over this portion of the State.

WHITEHALL, IOWA.—The Citizens' Telephone Company has issued an announcement to the effect that free service may be had any place in the county, providing the patrons limit their conversation to five minutes. When the call exceeds that limit a toll charge will be made.

SPRINGFIELD, MO.—A bill has recently been introduced before the House of Delegates fixing the maximum amount that may be collected for telephone service in residences at $25 per year. This has in view the abolition of slot machine telephones in residences.

NATCHEZ, MISS.—A large number of citizens and the members of the Volunteer Fire Department recently held an indignation meeting in which they protested greatly against the service given by the Cumberland Telephone and Telegraph Company in this city.

CLEAR LAKE, S. D.—The Clear Lake Telephone Company is issuing a new directory which will be much larger and more convenient than any issue heretofore. The subscribers list of this company is growing at such a rapid rate than the new directory is a necessity.

EL PASO, TEXAS.—A resolution presented by Mayor Joseph U. Sweeney has been adopted by the city council, authorizing the city attorney to proceed against the Southwestern Telephone and Telegraph Company for the purpose of restraining it from raising its rates for telephone service.

VIRDEN, MAN., CAN.—Members of the Manitoba government met a delegation of farmers here anxious to secure a rural telephone system in Wallace municipality. A canvass is now being made and if sufficient subscribers are secured a rural system will be built and connected with the government line. Address all communications to Reeve Stinson, Virden, Man., Can.

FORT WILLIAM, ONT., CAN.—This city owns and operates its telephone system with success. There are 1,200 instruments in use, the charge being $24.00 for business and $12.50 for residential purposes.

PERSONAL.

Z. A. CAHOON has been promoted from the management of the Chelsea exchange of the New England Telephone Company to the larger office at Malden.

M. H. HELLMAN has been elected treasurer of the Home Telephone & Telegraph Company of Los Angeles, Cal.

W. H. HOWARD has been appointed manager of the exchange of the Pennsylvania Telephone Company at Bethlehem, Pa.

RALPH M. MANDELL has recently been promoted from the management of the Malden exchange of the New England Telephone and Telegraph Company to that of its office of Manchester, N. H., with a number of smaller exchanges in the vicinity.

H. L. MANOROOF, of Oklahoma City, has been appointed manager of the exchange of the Independent Telephone Company at Taylor, Tex.

S. A. McKIE has been promoted from the management of the Taylor exchange of the Independent Telephone Company to its office at Brownwood, Tex.

B. S. YOUNG, of Ada, Ohio, is now at Paris, Texas, looking after the interests of the Citizens' Telephone Company, of which he is president. Mr. Young expects to remain in the southwest for some time.

On the Firing Line

HON, ARKANSAS.—The Telephone Company of Hon has recently completed its exchange equipment and a line is now being built from Hon to Cauthron and Bates.

GOSHEN, IND.—Many improvements are to be made in its system by the Home Telephone Company. It is estimated that the cost will be in the neighborhood of $20,000.

ROCKVILLE, IND.—The Parke County Telephone Company is making extensive improvements in its exchange system here and in Montezuma. The aerial construction will be generally overhauled and many new lines built.

DIKE, IA.—The advisability of building a telephone line from Cedar Falls to Dike is being considered by W. P. Walker and E. B. Roush, of Cedar Falls. Another line is also to be erected southwest of Dike.

HUMBOLDT, IA.—Among the improvements planned by the Rural Union Telephone Company is the installation of a new switchboard.

SABETHA, KAN.—The Mutual Telephone Company is arranging to place about seven hundred poles and install new aerial construction. The company also expects to purchase a building suitable for an exchange as soon as possible.

BOWLING GREEN, KY.—To take care of its increased business, the Home Telephone Company is preparing to make many improvements in its local system. A number of new outside and underground cables are to be put in, the switchboard capacity increased, and the plant made strictly up to date. It is estimated that about $20,000 will be expended.

EUNICE, LA.—The Eunice Telephone Company is making extensive improvements in its system and is rapidly enlarging to take care of its increasing business.

AKRON, MICH.—The Moore Telephone Company is to extend its lines from near Caro to Akron. Plans are also being discussed for erecting lines through Wisner township to Quanicassee.

SAGINAW, MICH.—The Valley Telephone Company has completed plans for its new exchange. Considerable toll construction work is planned, as well as many improvements at Bay City, Flint and other places.

ENTERPRISE, MINN.—The Tri-State Telephone Company is constructing many new lines and making improvements in its construction in this city and vicinity.

MARIETTA, MINN.—The Marietta Telephone Company is doing considerable construction work south of this city.

PARK RAPIDS, MINN—An association has been formed in this place for the purpose of building and equipping a telephone line from here to Itasca State Park and several post offices and stores in and about the park.

STEVENSVILLE, MONT.—The Stevensville Telephone Company is engaged in building a new line along the Burnt Fork road. The material is already on the ground and service will be given over the lines in a short time.

MINNEWAUKON, N. D.—Many new improvements and extensions are being made to the system of the Farmers' Rural Telephone Company at this city.

NEW ROCKFORD, N. D.—The Independent Telephone Company has completed its toll line between Jamestown and this city.

PINGREE, N. D.—The Pingree-Foothills Telephone Company has just received a consignment of poles which will be used in constructing a number of new lines.

PLAINGROVE, PA.—The Plaingrove Telephone Company has just completed several branch lines extending into Mercer and Butler counties. The Plaingrove company has experienced a very healthy growth ever since its inception, and has in mind many more extensions which will be built in the coming year.

CLEAR LAKE, S. D.—The Clear Lake Telephone Company contemplates the construction of several new lines out of Clear Lake in the near future.

GEDDES, S. D.—A new line from Geddes to Bloomington is being constructed by the Dakota Central Telephone Company.

NEWARK, S. D.—The Social Telephone Company is engaged in constructing several extensions out of this city.

HARTSVILLE, TENN.—The system of the Home Telephone Company is rapidly nearing completion. The exchange at Hartsville is being installed and it is expected to have it in operation within a short time. This company will have long distance connection with Nashville, Louisville, Evansville, Henderson and Birmingham, and later via Birmingham with New Orleans.

PALESTINE, TEX.—The Palestine Telephone Company has just moved into its new exchange building, where it has installed a new exchange equipment that is thoroughly modern. The company will make many extensions and improvements in the outside construction this year.

SUNNYSIDE, WASH.—The Yakima Valley Telephone Company is experiencing a very rapid growth. New lines will be constructed in several directions out of this place to take care of the farmers, who are desirous of securing telephone connection.

SHERRARD, W. VA.—The National Telephone Company is pushing the construction of its long distance toll lines out of this city.

CASHTON, WIS.—Owing to the greatly increased business of the new telephone company at this city, a new switchboard is to be installed.

GRAFTON, WIS.—A great improvement to the system of the Grafton Telephone Company has been brought about by the installation of a new switchboard.

GRAND RAPIDS, WIS.—Among the many extensions and improvements which are being made to the Wood County Telephone Company's system is the installation of a new switchboard and long distance service.

SILVER LAKE, WIS.—The Farmers' New Era Telephone Company is making many extensions to its system at Silver Lake.

CRYSTAL CITY, MAN., CAN.—A new switchboard has been installed by the Louise Telephone Company. Crystal City, Clearwater, Snowflake and Pilot Mound are now connected; a new line is being built to Mather, and connections are to be established with Purves and Mowbray.

UNDERGROUND.

BOWLING GREEN, KY.—The Home Telephone Company contemplates the installation of an underground conduit system in certain portions of this city.

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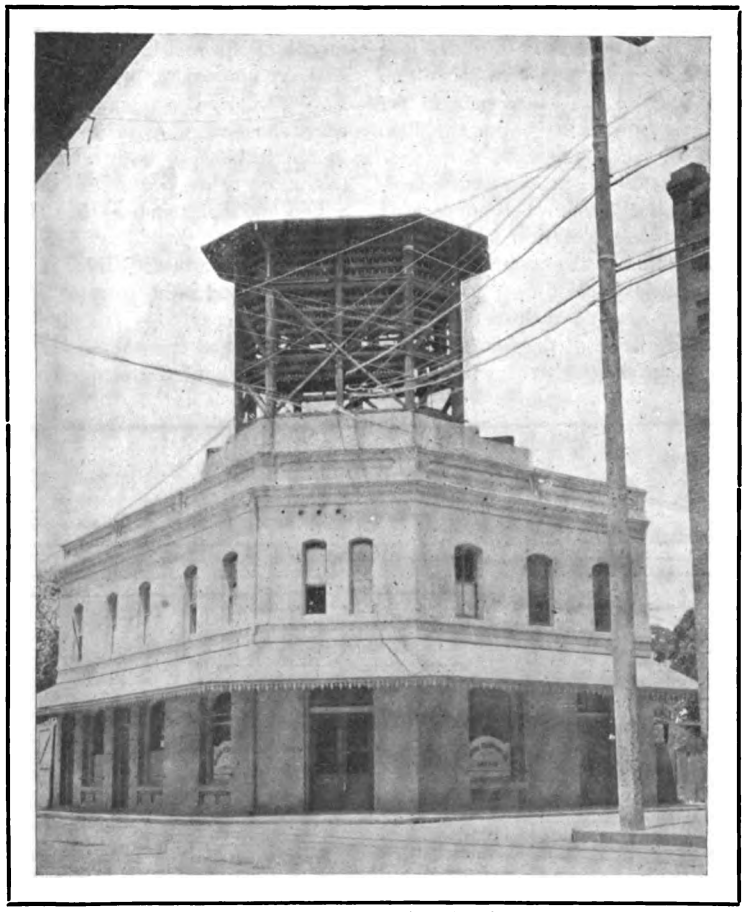
A Group of Telephone Contrasts

By B. H. Skinner.

EXPERTS in telephone construction will say at first glance that the accompanying illustration shows a piece of old-time work such as was commonly seen in the days when the Law system was in general use. As a matter of fact, however, this building, which is at present standing in Honolulu and still bears the old tower, is especially interesting because it represents just now three important stages in the development of telephone engineering. In many American cities there are but a few telephone men who were connected with the business at a time when it was considered the proper thing to bring all wires converging on pole lines, over roofs, fences and, in fact, from every conceivable form of support to a huge tower carrying many pins and insulators and located on the roof of the exchange. This practice in a climate where the wires are exposed to violent storms, with snow and sleet, led to such a mixing up of subscribers that the old timers will long remember it, although it has been obsolete for some years on the American continent. In Honolulu, where the climate is milder, open wires have been kept on the tower until a comparatively recent date, having been taken off only about four years ago. Then aerial cable was put in to carry most of the wires into the telephone company's central office, but as the change to cable distribution was not made all at one time the old tower was kept in place. Now it stands as a monument to an almost forgotten period in the rapidly developing art of telephone exchange construction. It serves as a convenient support for aerial cables and at the same time accommodates a few pairs of rubber covered wire running to nearby buildings. Thus the building with its tower represents in a visible manner the change from open wire to aerial cable types of distribution.



Telephone Exchange Building at Honolulu, Showing Steps in Transition from Old Open Wire Distribution from Tower to Modern Cable Plant.

Below the roofs things are even more up to date. The writer has been directing the installation of a common battery multiple switchboard, and when it is put in service a correspondingly changed outside plant will also be available. Conduits have been installed which provide for the distribution of wires for the present and some time in the future throughout all the business districts of the city. Cables have been pulled into them and aerial cables which now encumber the street in the business section of the city will be done away with entirely, all wires being carried through the new ducts. The only places where aerial cable and open wire will be in evidence will be in the outside portions of the city. Plans have been made for doing away with the small exchange known as the Waikiki office, which handles about seventy-five lines, and these will be brought into the main office through cables. When the new plans for handling the telephone business done by this company in Honolulu go into effect the old tower and the aerial cable which hangs from it will disappear. This will leave the building clear of what has come to be considered a useless incumbrance, not only by the people of the city, but by telephone engineers who realize that the most efficient and economical telephone system is likely to be the one which is least apparent to the public eye.

Under the old system the exposed condition of the outside plant was accompanied by many troubles which cannot be produced when subscribers are served through wires led in a properly constructed conduit system beneath the surface of the streets. The general passing of the tower support above central offices, which in this particular city has been for special reasons so long delayed, was but the first indication of the general tendency which is now so apparent in all quarters. Both the duty to protect subscribers from every preventable risk of interruption to service and the necessity of keeping maintenance and depreciation charges low have brought about conditions which make the longer existence of the class of construction shown in the photograph undesirable.

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Talking and Telegraphing Simultaneously Over the Same Line

Article IV—Arrangement of Apparatus for Facility in Handling, Concluded

By N. C. Kissell.

THE circuit of a "Morse" board of the type which experience has led telephone engineers to develop is shown in Fig. 3. This consists of rows of jacks placed vertically, a neutral drop being placed at the top of each row. Each trunk from the test board passes through one winding of the neutral drop, then through four jacks in series, through the second winding of the neutral drop terminating in a battery jack. Above this are placed two jacks, each connected to battery through a resistance lamp and heat coil. The battery is arranged to give 220 volts across the terminal, plus and minus terminals being brought out and a ground connection made at the center, thereby giving a potential of 110 volts between either end and ground. One jack is connected to the positive side, and the other to the negative side of the battery. Repeaters and subscribers' loops are wired to plugs placed on a cord shelf. The battery jack of the trunk is connected to either positive or negative battery by means of two plugs connected together with a short cord. The three trunking jacks on the test board are connected together as shown, the wire passing in series through two and terminating in the third. In this third jack is placed the "Morse" leg from the simplex or composite set. The other two jacks are for the purpose of allowing the test board men to get on the line with their telegraph instruments to watch the line. It will be seen that the "Morse" board consists of a number of battery taps and trunks which terminate at the test board, each trunk being equipped with a neutral drop. The purpose of the latter is to attract the repeater man's attention to that line if wanted. If positive battery is connected to the battery jack, current flows through one winding of the neutral drop through the four jacks in series, then through one winding of the drop out to line. If the subscriber's loop is plugged in one of the jacks, current flows out over the loop and back again through the winding of the neutral drop to line. The current passing through one winding of the drop is neutralized by the current passing through the other winding, as the two windings are connected in opposition to each other, and consequently the drop normally remains inactive. If the subscriber desires attention he pushes a button which grounds one side of his loop. This throws the drop out of electrical balance, by causing more current to flow through one winding than the other, and the shutter of the drop falls, closing a local circuit which rings a bell and thus attracts attention to the board. The repeater man, upon seeing which drop is down, plugs in that trunk with his instrument which is placed on the board, and ascertains the subscriber's wants. One "Morse" line can be connected to any other by plugging in a repeater set in their respective trunks. Also, a line can be changed from a straight to duplex, by inserting duplex sets in the trunks, or in fact any combination can be made at this board which is liable to arise in practice.

The amount of current on the "Morse" line is maintained as closely as possible to 60 milliamperes. This is controlled by means of the resistance lamps on the lamp board. On long lines that are simplexed, the leakage in wet weather may be excessive. For example, if a telephone line 300 miles long is simplexed, the telegraph current passing over both wires in multiple is subject to the leakage of both wires, or the leakage will be equivalent to that on a line 600 miles long, although its resistance will be as a line 150 miles in length. If this leakage is great it is better to composite, providing one has another telegraph circuit to operate on the other wire. It is not good practice to use a composite set and only operate "Morse" in one wire, as best results for talking purposes are obtained when the conditions on both line wires are the same. If a line is composited the current should be about the same strength and flow in the same direc-

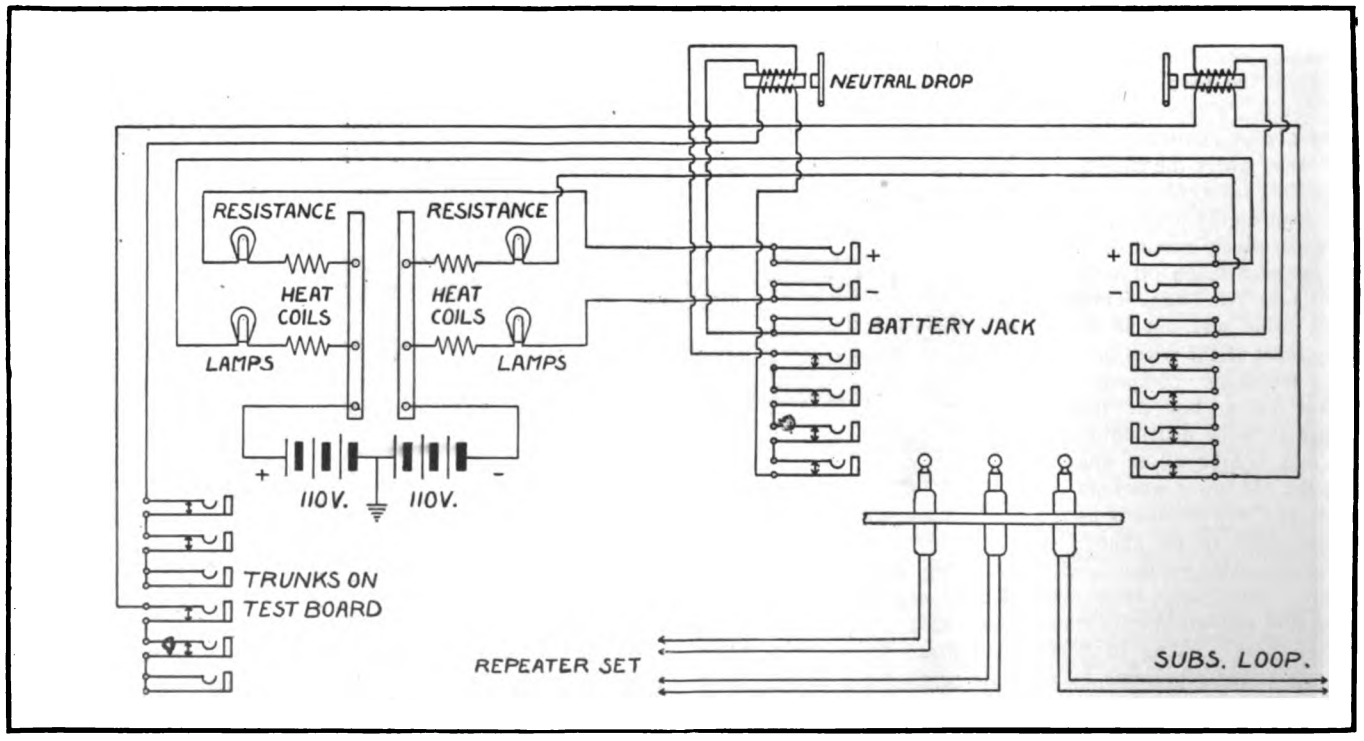

Fig 3. Circuits of "Morse" board commonly used by telephone companies to facilitate attachment of apparatus to telephone lines for giving simultaneously a telegraph service.

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tion in both wires, to keep down as much as possible any difference of potential between the two line wires. For instance, if a line has been composited the two trunks at the Morse board to which the respective sets are connected should be joined either to positive or negative battery, depending on the polarity of the battery at the distant station, and the resistance lamps so adjusted that about the same current flows over each line wire. Adjustment can be made by taking observations with a milliameter. This will cause the drop along each line wire to be about equal and homogeneity is obtained, which is very desirable.

If it is desirable to obtain a phantom from two lines, the latter are simplexed and the two "Morse" legs inserted in the jacks of one of the extra lines to the toll board, terminating the phantom in the board. By taking the "Morse" legs out of these jacks and placing them in the ones below them which are connected together, then inserting the line plug of a composite set in these jacks, and plugging the drop side into the board on one of the extra lines, it is possible to obtain a composited phantom which can be used for "Morse" work. Fig. 4 shows such a circuit, with the two "Morse" legs duplexed, thereby enabling three telephone conversations and four "Morse" messages to be transmitted over four wires at the same time without interfering with one another, provided the lines are properly built and maintained.

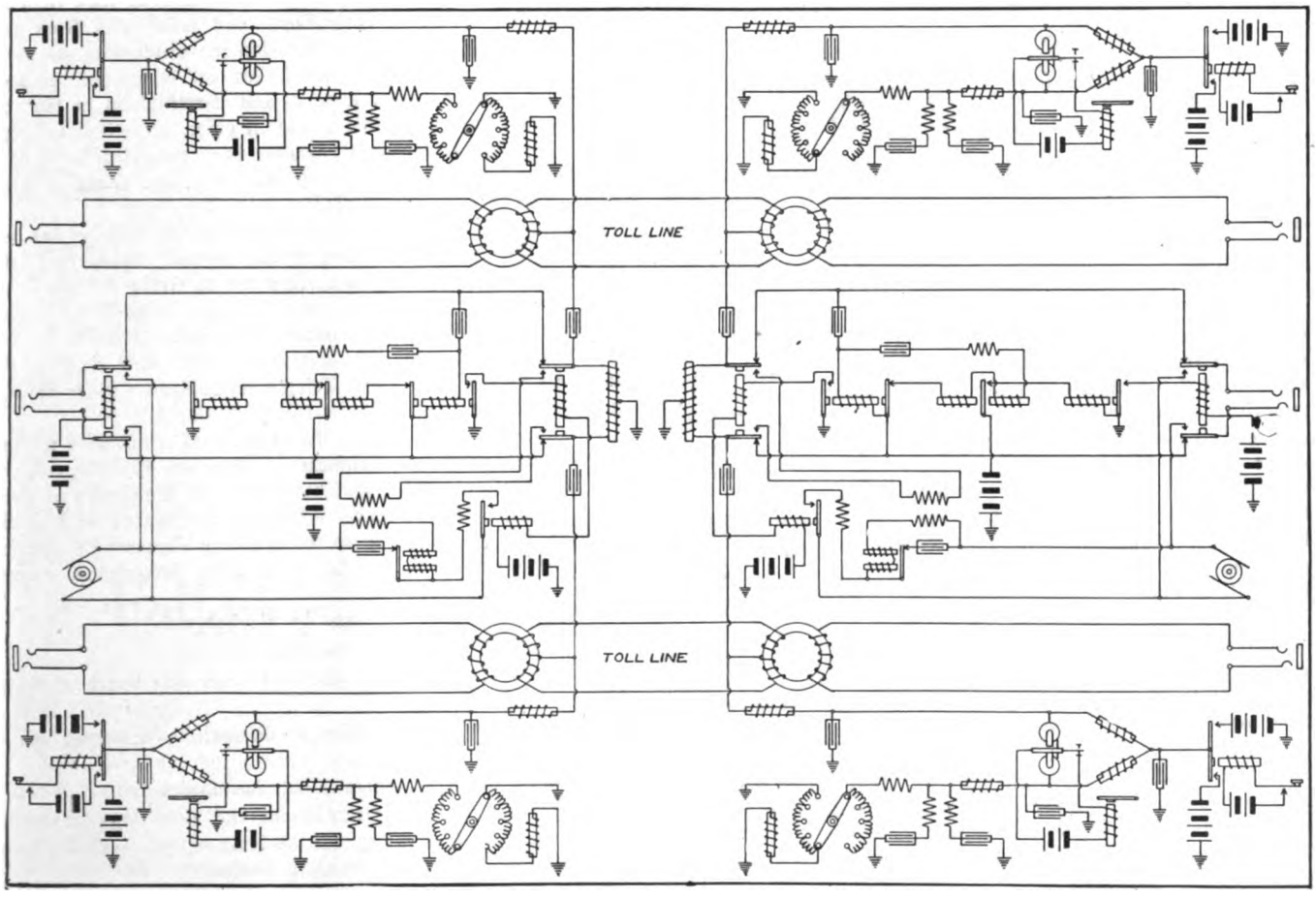

Fig. 4. Composited phantom telephone line. By the attachment of apparatus indicated at the respective central offices two pairs of wires can be made to carry seven messages at a time.

The Pupin Mode of Working Trunk Telephone Lines*

By Sir William Preece.

In 1896 I read a paper before Section A at Liverpool on "Electric Disturbances in Submarine Cables," in which I dealt with the subject of long distance-speaking by telephone. I pointed out that disturbances were due to energy being in the wrong place. An alternating current wave, set up in a telephone transmitter by a complete sonorous vibration impressed on the diaphragm, flowing for the period *a g* (Fig. 1), if its voltage were indicated by *a b* when *positive* and by *d e* when *negative*, would possess in one received wave an energy proportional to the area bounded by *a b c d e f g*, if it were wholly utilized, but would only describe the area *a a' d d' g* if the unshaded portion of the figure were proportional to the energy radiated or leaked away, absorbed as a charge or dissipated as heat. The attenuated current thus indicated shows what radiation, leakage, capacity, hysteresis, and resistance may do to absorb energy and deteriorate the clearness and loudness of speech as well as limit the distance to which ordinary speaking is practical. I had previously,† in 1887, pointed out that the product of the capacity, K, and the resistance, R, gave a law which approximately indicated the distance to which speech was possible on telephone circuits. It accurately indicates the distance on single wire submarine cables. In 1890 I read a paper giving the calculations on which the London-Paris telephone line, with its cross-channel cable, was designed and constructed in association with the French engineers. In 1892 it was determined to establish trunk telephone wires between the great commercial centers of Great Britain. All the calculations were based on the K R law. It is quite certain that this law is not absolutely true, for it neglects the factor of

*Abstract from a paper read before the British Association, at Leicester.

†On the "Limiting Distance of Speech by Telephone," Proc. Royal Society, vol. xlii., Feb. 17, 1887.

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self-induction. The K R law is properly of the order K R L, but experience has shown that inductance on short metallic loops is so small that it may be neglected. Mutual inductance between the two capacity wires compensates to some extent the self-induction in each wire. In long underground cables and long aerial wires, however, the influence of inductance becomes evident as the length of lines increase. On the other hand, capacity also increases owing to the variation of the mutual (wire to wire) capacity and the capacity of each wire to earth, which becomes an important factor with concentric cables or with any departure from symmetry. This is why "Hughes's twist" is so valuable and so superior to the "Cross" system so general in America. It not only completely prevents "cross-talk," but it secures a constant capacity with earth. It is known that the effect of this electromagnetic induction is beneficial in one sense, as I pointed out in 1896, and it has been made more beneficial in another sense by Prof. Pupin (1899), who has shown how we can reduce the weight of copper used on trunk lines and also how we can extend the distance to which ordinary speech is practical.

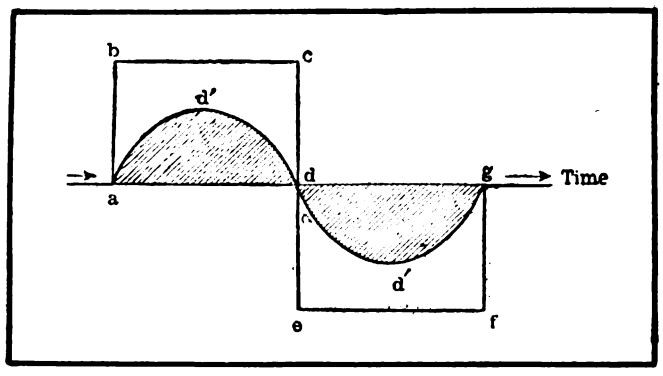

Fig. 1. Diagram illustrating dissipation of energy in a telephone line.

Pupin's system is not so much the neutralization of the effects of electrostatic capacity by those of electromagnetic inductance as a system of hastening the discharge of pent-up energy, without additional loss by breaking it up into many successive steps. In a long submarine cable discharge is a slow process, and all in one operation. The K R is great and the frequency small. In a "loaded" line it is much more rapid, for it is performed simultaneously in several successive stages of much shorter length and with much less waste or distortion. The factors of energy, E and Q, are pent up by capacity and inductance. Energy is wasted by resistance, leakage, induction, radiation, reflection, and interference. This waste of energy means diminution of amplitude, attenuation of wave volume, and loss of speech; while electromagnetic induction improperly placed means distortion of wave form, external disturbances, and loss of articulation. The factors that are involved in the problem of long distance speech are so numerous and so diverse that all attempts to solve them by mathematics, except on very general grounds, have proved fruitless and only approximately true. It has been only by practical experiment that success has been attained.. The defect in the mathematical investigation of the problem appears to be the neglect of the prime and principal factor, *energy*, and the assumption that there is in nature something analogous to *negative* energy. Energy, like matter, is always positive and it cannot be annihilated by a negative sign. But mathematical reasoning undoubtedly guided Prof. Pupin in going as far as he has. Our president, Prof. Silvanus Thompson, took out a patent on December 21, 1891, No. 22,304, where he very carefully considered the subject and very nearly anticipated Pupin.

The establishment of the telephone trunk system in Great Britain in 1896 showed the practical value of the K R law in determining the construction of an aerial system. The weight of copper used in the main trunk lines has been criticized, but the only fault committed was that I did not specify enough. Paris can speak with Liverpool, Manchester, and Hull, but it cannot do so commercially with Glasgow and Edinburgh. London can speak with Aberdeen, Inverness, and Dublin, but not with Cork. Pupin coils have not been applied permanently to the post office trunk lines, but careful experiments have been made to feel the way to do so, and thus, perhaps, extend the range of Paris talks in Great Britain.

I designed a new form of cable and described it in my paper read before Section A in Liverpool in 1896, but no one has as yet ventured to test its merits. A cable designed by Mr. Willoughby Smith of four wires symmetrically twisted on the inside of a guttapercha tube so as to leave an air space, failed telephonically from imperfect symmetry. It was laid across the Irish Channel, from Nevin to Newcastle. Concentric underground guttapercha-covered cables were laid in 1895 from the General Post Office to Nine Elms, and failed also from want of symmetry in the capacities between the conductors and earth. A magnificent underground trunk line for telegraphic purposes was commenced between London and Birmingham in 1897, but it was not completed while I was in office (I retired in 1899), and owing to its success it has now been extended, or is being extended, to Manchester, Liverpool, Leeds, and Glasgow in the north, and to Plymouth and Dover in the south.

In 1899 Pupin proposed his coils, and great progress has been made in the States in developing the system. Many very valuable experiments have been carried out in Great Britain by the Post Office and by the National Telephone Company. I purpose to report the results of a careful inspection I made in New York in April last of the very successful work done in this direction by the New York Telephone Company under the able direction of its chief engineer, Mr. J. J. Carty.

The factors that enter into the problem of trunk-wire working are very numerous and complicated. They are *physical, commercial,* and *personal.* It is, as I have said, not a question of mathematics, but of experiment. What are the factors in long distance speaking, in addition to the ordinary elements of electrical energy—viz. E M F, resistance, capacity inductance, current, and time?

1. Eddy current heat losses in diaphragms.
2. Hysteresis in coils, cores, and circuits.
3. Change of wave shape due to storage and waste of energy in other forms.
4. Attenuation of waves due to dissipation of energy and its absorption.
5. Loss of the higher notes called "harmonics."
6. Reflection of waves from breaks and alterations in circuits.
7. Reduction of efficiency due to leakage, polarization, radiation, and induction to neighboring bodies.
8. The reactions and interferences of neighboring circuits.
9. The constant change of every condition of circuit elements by switching through to different towns and subscribers.
10. The variable formation of the human mouth, tongue, and teeth of different users.
11. Defects of articulation and want of experience in handling the apparatus by the users.
12. The inefficiency of hearing and interpretation of the listener, and the absence of silence about him.
13. The absence of telephonic education in both speaker and listener.

The remedies are self-education, selection of proper apparatus, symmetry of circuits, the proper distribution of the controlling factors, the restoration of stored-up energy, the alliance and mutual forbearance of users and suppliers. It is clear from this incomplete enumeration of the factors involved that the problem of the reproduction of clear speech at a variable distance is a very complicated one. It has been solved by very patient plodding, by incessant experiment, and by judicious compromise. The K R law as applied to submarine cables is very useful for calculating the speed of working, but inasmuch as trunk telephone circuits are aerial and telephone currents alternating and very variable in form, self and mutual induction must play an important part in their propagation. It was found, however, by experiment that metallic circuits of copper wire suspended in air and constant in character were actually benefited by self-induction. Hence, in de-

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signing the trunk system of the post office in 1891, inductance* was neglected.

Ever since Faraday in 1853, while I was assisting him in his experiments, detected two waves in the underground conductors between London and Liverpool, I have regarded the propagation of intermittent electric currents, whether alternating or direct, in ordinary insulated conductors to be in the form of waves. Cromwell Varley in 1870 made an artificial cable equivalent to one of 12,000 miles long, and showed in evidence 10 distinct currents in it flowing at the same time. I experimented in 1876 at the Silvertown Works on an artificial cable constructed for Mr. Stearn to duplex the Atlantic cable, and obtained evidence of several distinct waves present at the same time with beautiful effects of interference in duplex working. These were waves of energy in its electric form propagated with comparatively slow and variable velocity. Hertzian waves, developed in 1887, are disturbances of the ether of very high frequency, of the order of millions per second, having the velocity of light—viz., 186,000 miles per second. Telephonic oscillations in insulated copper conductors are of the order of hundreds per second, having a variable velocity of the order of 1,000 miles per second. The length of a telephonic wave may be from 1 to 100 miles, but that of a Hertzian one may be from 1 ft. to 10,000 ft. Prof. Pupin in 1900 established the existence of these waves in telephonic circuits, and measured their lengths, their form, and their damping. He has reached a practical stage and has been the means of creating a very great advance in the economic development of long-distance telephony.

Between the voice of the sender at one end and the sensation of hearing at the other end the energy passes through several forms—acoustic, thermic, electric, magnetic, kinetic, and potential. The relations of these changes are very varied and complicated. The elements of energy in its electric form are coulombs, Q, and volts, E. Currents are coulombs per second. Thus time is an essential element, and the frequency of waves, and, therefore, their length is a dominant factor in the solution of the question. When electrical energy is transmitted by an insulated metallic circuit like a telephone line we must first consider the capacity, K, resistance, R, and inductance, L, of the circuit. The capacity, K, depends on its form, its length, the dielectric coating and the surrounding medium. The resistance, R, depends on the metal used, its form and its mass. Copper is universally used for telephonic transmission. The influence of inductance, L, depends on the electromagnetic condition present in the field, on the form of conductor, and on the direction and rate of change of the currents. The capacity absorbs energy. It holds up a certain portion of the quantity of the charge, tending to attenuate the current, but ready to restore it in reaction. The insulating medium gets warm by hysteresis. The resistance which has to be overcome absorbs a portion of the energy, which takes the form of heat and is lost.

The Pupin coil stores up another portion of the energy, which, like a spring under pressure, is ready to react on the release of the forced condition and is restored. The frequency within the region of the ordinary speech, which may be said to have from 800 to 1,200 sonorous vibrations per second, is not changed, but as distance increases the fine harmonics which give the individual quality or *timbre* of voice disappear, and only the low fundamental tones remain. Thus the length of a circuit allowing a practical talk is limited by the amount of capacity and resistance present. It is increased by the presence of induction when this induction is put in the right place and is of the right character and amount. It is aided by the human ear, which has a magical gift for interpreting into speech what appear to be the merest phantoms of sonorous vibrations.

(*To be continued.*)

Following Up Lost Calls on Toll Lines

By S. A. Hensley.

TRACING lost calls can be made a means of furnishing a substantial increase to the revenue, not only of a toll line company, but of the local companies with whom it transacts business. After an investigation of this matter, in which considerable thought was given to devising the most suitable plan for obtaining the proper official action from connecting companies, in order that both promptness and definiteness might be secured, a series of postal cards were devised by the Western Telephone Company, of Lincoln, Neb. These cards are written out in advance, according to the forms which are reproduced in the accompanying illustrations. The few words which are necessary to complete the card can be filled in by the chief operator, who also addresses the card, and it is then ready for immediate mailing almost as soon as the failure to establish a connection becomes known. The card corresponding to Fig. 1 is used for calls lost on account of the calling party not being able to hear the person with whom he wishes to speak after the connection is established. This card is useful in many instances of faulty maintenance, etc., and serves to call the attention of the interested persons directly to the fact that they are losing good paying business by allowing troubles to remain uncleared, if they are in the habit of doing so. The fact that the card goes to headquarters serves to keep all the employees on the alert, as they do not like to have their attention called to their laxity under such circumstances.

The card shown in Fig. 2 is used in the same manner, being sent to the manager of a telephone company for which

Lincoln, Nebr. 1907.

Gentlemen:

On August 22nd. we lost a call from Mr.-------At---------to Mr.--------at---------
Because parties could not hear. Will you please investigate this.

Yours very truly,
WESTERN TELEPHONE COMPANY
Lincoln, Nebraska.

S. A. Hensley

Fig. 1. Postal card form sent to manager of a connecting company when a toll company loses a call through failure of calling party to hear conversation.

Lincoln, Nebr. 1907.

Dear Sir:

Our Long Distance Operator reports frequent lost calls to Mr._____at_____because Mr._____has no INDEPENDENT TELEPHONE.
Would it not be well to investigate this, and see if you cannot secure Mr._____as a subscriber.

Yours very truly,
WESTERN TELEPHONE COMPANY.
Lincoln, Nebr.

S. A. Hensley

Fig. 2. Postal card form sent to manager of Independent company when a call has been lost on account of called party having no Independent telephone.

*Inductance is the coefficient of mutual and self-induction. It is indicated by M or L, and is really a length measured in centimetres.

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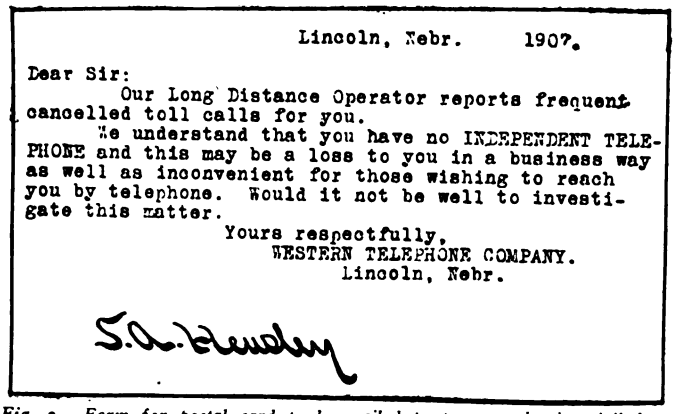
the call was received. While, of course, some of these calls can be put through to a public pay station, this cannot always be counted on, as the messenger charges form an increased expense which the calling subscriber is frequently unwilling to bear. These cards are particularly useful where there is opposition, as the manager is frequently enabled to show some person that he is losing business by not having an Independent telephone.

Not only is the manager notified of the failure to receive calls, but the non-subscriber himself is given an immediate reminder on a postal card worded, as shown in Fig. 3. Thus, by the time the manager or solicitor comes to see him, in order to induce him to subscribe, he may have actually looked up the case, and discovered for himself that he has been put



Lincoln, Nebr. 1907.

Dear Sir:

Our Long Distance Operator reports frequent cancelled toll calls for you.

We understand that you have no INDEPENDENT TELEPHONE and this may be a loss to you in a business way as well as inconvenient for those wishing to reach you by telephone. Would it not be well to investigate this matter.

Yours respectfully,
WESTERN TELEPHONE COMPANY.
Lincoln, Nebr.

Fig. 3. Form for postal card to be mailed to person who has failed to receive a toll call on account of having no Independent telephone. This form is sent out at the same time that the one reproduced in Fig. 2 goes to the manager.

to a loss through not having an Independent telephone. The Independent telephone company, under these circumstances, has a good basis to work on when it comes to secure his contract.

The Western Telephone Company thinks that the use of these cards has brought many advantages to itself, and it seems to be the general opinion they are a great help to Independent managers throughout the State. The writer has wished to make this idea public, in order that it might be available for the use of other Independent companies who think it would help them to build up their business.

PROGRESS OF WORK ON MAPS SHOWING INDEPENDENT TOLL LINES.

THE International Independent Telephone Association reports that it can furnish maps of fourteen States showing the present condition in respect to Independent toll line development. The map of Ohio has been printed and copies will be sent postpaid upon the receipt of twenty-five cents. Maps for the other States are furnished in the form of blue prints, which are made to order at a small charge to cover the cost of postage. The association is also able to furnish a blue print showing the principal Independent long distance connections from the Atlantic coast west to Central Nebraska. Full particulars can be obtained by writing to the office of the association at Cleveland, O.

INDEPENDENT SYSTEM AT BUTTE, MONT., NEARLY COMPLETED.

REPORTS from Butte, Montana, state that the finishing touches are being put to the new building of the Montana Independent Telephone Company. The switchboard men are working overtime to get the central office equipment installed as soon as possible. It is said that equipment for 3,500 subscribers will be set up, while the exchange is arranged to have an ultimate capacity of 10,000. The ground floor of the building is to be occupied by the company's general offices and the long distance apparatus. The basement, which will be used for a stock room, contains a fireproof vault, and other vaults have also been constructed on the first and second floors. Pole setting and underground conduit work have been making good progress, so that the outside plant is practically finished. Cables have been installed and connected up to the central office, and instruments are being put in.

One of the officials of the company reported recently that orders for more than 2,500 telephones have been booked, while 2,000 stations have already been wired up.

Orders for new instruments are being received so rapidly that the company is unwilling to make an estimate of the number of subscribers who will be receiving its service when the current is turned on to the board. As soon as the Butte exchange is in operation the company intends to proceed at once with construction work in Anaconda, Great Falls, Helena and other points in Montana.

BELL COMPANIES DISCONTINUE SPECIAL RATES FOR NIGHT SERVICE.

THE American Telephone and Telegraph Company and several of its licensees last week announced that, beginning September 1, special night rates equivalent to one-half the day rates for long distance calls would be discontinued and that all connections would be charged for at the published day rates. The reason assigned for this change is that when the low night rates were established there were relatively few long distance calls. The companies found that late in the afternoon and during the evening the wires were practically idle and it was necessary to give a reduced rate in order to stimulate business during these portions of the day. It is said now that the great increase in the telephone business has provided sufficient traffic to keep the wires busy during the entire day and the existence of the low night rate has suggested to business men the practice of making appointment calls for conversations immediately after 6 o'clock. The result has been that a large amount of business is transacted with a rush in the evening hours, and the wires which suffice for handling the regular business throughout the day are overcrowded in the early part of the evening. The companies announce that they believe the charging of full rates will cause a better distribution of traffic, so that it may not only be more economically handled but that an improvement in service will be effected. It has been pointed out by the officials of the companies interested that, although telegraph companies permit the sending of night messages for half rates, this is no reason why a telephone company should do so, as a telephone call necessitates a connection at the earliest possible moment, while a telegraph message to which the night rates apply may be sent on at any time during the night when the lines happen to be idle. Even the telegraph companies charge their regular day rates on a message for immediate delivery.

MICHIGAN STATE TELEPHONE COMPANY DENIES CHARGES OF FRAUD.

THE Michigan State Telephone Company is attempting by injunction proceedings in the United States Circuit Court at Detroit to prevent a trial in the Wayne Circuit Court for the charges of fraud and conspiracy made by Mrs. Matilda C. King. Mrs. King, who held as a portion of her husband's estate a block of stock in the old Michigan Telephone Company, seeks to attack the sale of the old company, under a foreclosure decree of the federal circuit court, to the brokerage firm of N. W. Harris & Company, and the subsequent taking over of the telephone concern by the organization of the Michigan State Telephone Company. She alleges that the American Bell Telephone Company, sometimes referred to as the "telephone trust," is the real owner of a large share of the stock, and that the federal circuit court was imposed upon in the foreclosure sale. Her action is filed in the Wayne Circuit Court, and has been halted by a temporary injunction issued by Judge Swan, upon the application of the telephone company, which claims that the suit is intended simply to attack the decree of the United States Court, and to retry the same phases of the case that have already been passed upon by Judge Swan. It is contended that the jurisdiction of the case still rests exclusively in the federal court, and upon this contention Judge Swan is asked to permanently restrain the complainant from taking any steps to prosecute her case in the state courts.

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Answers to Practical Questions

THE MEGGER.—(911.)

Some time ago the city council of this place arranged for the construction of a municipal conduit system in which to place all wires now on poles in the business and fashionable residence sections. This means that our telephone cables must go in the same conduits and manholes as the telegraph, electric light, electric power, and fire alarm wires.

This being the case we are desirous of knowing that each cable we install is insulated from everything else sufficiently high, so that we will not experience trouble later on. We think it would be a good plan to test each one as it is pulled into the conduits and then we would know just about where to lock if trouble should ever occur.

What method would you suggest for so testing these cables? Kindly favor us with this information as soon as possible, as we are ready to commence installation of our underground cable. S. G. H.

If you have a pair of wires conveniently located with power, say about 220 volts, you could measure your insulation resistance up to three or four megohms with a portable voltmeter by the drop of potential method, the same as in measuring the ohmic value of any resistance.

There is in use in Europe an instrument for measuring insulation resistance called a "Megger." This is usually constructed very compactly, mounted in a neat carrying case and has the advantage that no set of batteries nor other outside source of power is required for its operation.

The construction of this instrument is shown in Fig. 911. A commutated magneto generator capable of producing a voltage of 500 volts when turned at the rate of 100 revolutions per minute is used to provide the continuous testing current.

The field-magnets of this generator also serve as field-magnets for the "ohmmeter" which, like the D'Arsonval galvanometer, is constructed with a pivoted coil called the "current" coil, moving in the gap between the poles of field-magnets and a hollow "intensifying" iron cylinder. In addition to this "current" coil is a "pressure" coil fixed to the pivot with its plane at an angle of about 50° to the "current" coil as is clearly shown in the diagram.

The "pressure" coil is smaller than the other and surrounds but one side of the hollow iron cylinder, having a gap as shown. The needle indicator is attached to the combined coils and describes an arc which is so graduated as to indicate resistance from .01 megohm to 100 megohms.

As the "current" coil is joined in series with the line circuit and generator and the pressure coil is joined as a shunt, the latter coil would get nearly all of the current with a high resistance in the line and would tend to lie in the gap at right angles

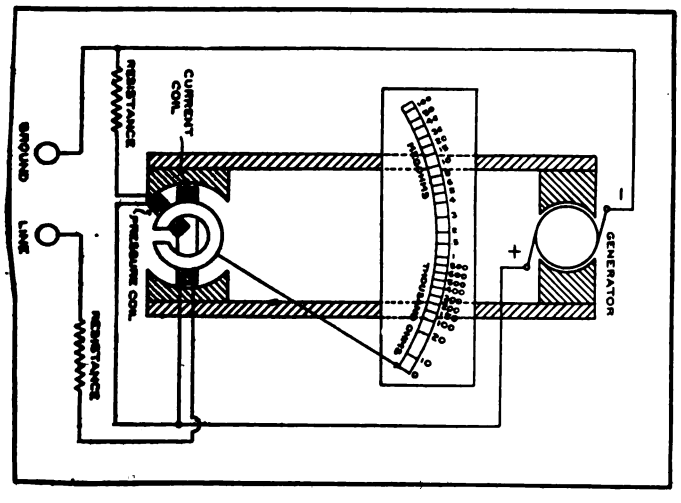

Fig. 911.

to the magnetic lines. With a small line resistance a large current passes through the "current" coil and tends to move in a direction opposite to the pressure coil. The position taken by the combination is due to the resultant of the two opposing forces.

Although the readings of the instrument are independent of the electromotive force of the generator yet the sensibility of the instrument is increased as the force is raised, as is the case of the Wheatstone bridge.

The resistances shown are simply for compensating purposes. A comparatively inexpensive instrument of this sort could be constructed by anyone possessing a small amount of mechanical ingenuity and the instrument after being completed could be calibrated with a potentiometer in the usual manner.

Size Roebling Gauge	Diameter in Inches	Weight in Pounds per Mile	Put Up in Bundles of (Mile)	Approximate Breaking Strain in Pounds.			Average Resistance in Ohms at 68° F.		
				E.B.B.	B.B.	Steel.	E.B.B.	B.B.	Steel.
4	.225	730	¼	2,190	2,409	2,701	6.44	7.53	8.90
6	.192	540	½	1,620	1,782	1,998	8.78	10.19	12.04
8	.162	380	½	1,140	1,254	1,406	12.37	14.47	17.10
9	.148	320	½	960	1,056	1,184	14.69	17.19	20.31
10	.135	260	½	780	858	962	18.08	21.15	25.00
11	.120	214	½	642	706	792	21.96	25.70	30.37
12	.105	165	½	495	545	611	28.48	33.33	39.39
14	.080	96	½	288	317	355	48.96	57.29	67.71

The average value of the mile-ohm is 4,700 for E.B.B. wire.
The average value of the mile-ohm is 5,500 for B.B. wire.
The average value of the mile-ohm is 6,500 for Steel wire.
The average breaking strain is 3 times the weight per mile for E.B.B. wire.
The average breaking strain is 3.3 times the weight per mile for B.B. wire.
The average breaking strain is 3.7 times the weight per mile for Steel wire.
The mile-ohm equals weight per mile times resistance per mile.

Table 912.

ELECTRICAL AND MECHANICAL QUALITIES OF IRON WIRE.—(912.)

Can you furnish us with a method or table for determining the breaking strain in wire when the size and quality are known, or for the resistance and mile ohm value? We are referring to iron wire only, as we do not use copper.

We believe Table 912 will give you all the information you desire in relation to the question you ask. The values given in this table are averages of a large number of tests and are within the limits of the specifications of the Western Union Telegraph Company.

STORAGE BATTERY CONSTRUCTION.—(913.)

Will you kindly describe in an early issue of your valuable paper, the construction and chemical action of the chloride storage battery, advising if its construction is different from that of other storage batteries used in telephone work. Thanking you very much for your attention and for an answer, which I am sure will help me decide an argument, I am, C. D. V.

The difference in the two types of batteries is principally in the construction which is as follows:

In the chloride storage battery the negative plate consists of a pocketed grid having the openings filled with a paste which is formed in the following manner: A blast of air is forced against a stream of molten lead, producing a spray of lead, which falls as a powder when cool. This powder is dissolved in nitric acid and then separated as lead chloride by the addition of hydrochloric acid. This chloride washed and dried forms the basis of the paste used for filling the previously mentioned openings.

The positive plate is a solid grid composed of lead alloyed with five per cent. antimony, with circular holes three-fourths of an inch in diameter, staggered on about two-inch centers. Corrugated lead strips are rolled up in close spirals and forced into the holes in the plates. By electro-chemical action these spirals are formed into active material.

In the other type of storage batteries the plates are placed in steel jigs and given a backward and forward motion between two shafts which carry circular disks. These disks are forced into the plates, making a succession of parallel grooves. No metal is removed by this process. The plates are then subjected to an electro-chemical process to fill the grooves with active material.

The exact chemical action which takes place in storage batteries is not fully agreed upon. Some of the older authorities held the charging action to consist of the formation of peroxide of lead on the positive plate and metallic lead on the negative, which was converted into lead oxide on both plates at the time of discharge.

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As the Editor Sees It

LOST CALLS AS BUSINESS TRACERS.

THE following up of lost toll calls is a subject which has received much attention. Many companies are very careful to make special efforts to revive all calls which have had to be cancelled through the temporary absence of the called party, trouble on the line and other difficulties which are met with in practice. The brief article by Mr. S. A. Hensley serves to call attention to another very important service to which tickets on lost calls lend themselves. This plan has apparently been so successful where it is in operation that it is worthy of wider adoption by Independent companies. Its usefulness where a toll company operates in connection with local exchanges, which receive service through connection contracts made on a commission basis, will be very evident. It seems to be a plan for co-operation by means of which both parties can reap a substantial advantage without putting themselves to any considerable expense.

A TELEPHONE SOLICITOR'S IDEAL HANDY INSTRUCTION BOOK.

FIELD AGENTS who drill canvassers for book subscriptions could give some valuable pointers to the average telephone contract agent. They not only study the job for their men, but they put the results of their studies where they will be most useful. When these field agents go about picking out men who are to cover territory they give each candidate a drill book. A first-class drill book, such as that prepared by the firms which have achieved the greatest success in the selling of subscription books, contains every argument that a canvasser will have to meet in opposition to the proposition he is pushing. If the canvasser is letter perfect in his drill—if he knows his little book—he thrives on opposition. Once he can get his "prospect" to talking the man is lost. He is overwhelmed with arguments, cajoled with flattery or forced by an appeal to his vanity to a point where there is nothing left but to sign his name to the order book on a line pointed out to him by the canvasser at the precise moment indicated by instructions on a certain page of the drill book.

The wonderful thing about all this kind of work is that the man who takes the order does not have to spend days, weeks or months acquiring arguments and knowledge by his own experience. The groundwork is supplied to him. His talk is forced into his brain in whole sentences and paragraphs at a time. All he has to do is to give out what he has furnished him at the right time and with the right tone (vocal inflections according to directions on page so and so of the drill book).

Why does not some one get out a telephone solicitor's book that will put this branch of the business on as scientific a basis as that of the book agent? AMERICAN TELEPHONE JOURNAL would publish such a book and sell enough copies in a year to give the author a very comfortable income from royalties.

MEASURING VS. GUESSING.

SOME carpenters, when they figure on a small job, will hold a rule half way between their eyes and the hole they are going to fill with a piece of board, squint, try to look wise, mutter a few numbers and walk away. The next day they come back with a board half an inch too short. Of course this makes no difference. They can splice on a piece to fill the gap.

It is true that this kind of work saves a little effort on the first trip. It is easier for a carpenter to hold up a rule and squint than to lay it along the space he wishes to measure and observe its exact length. But in the long run the carpenter makes his time figure out something like ten hours with saw and plane and five minutes measuring, as against six hours with the saw and plane, which would have been the result of an additional five minutes in measuring. On the whole, time is wasted, the job is spoiled and the customer gets angry.

Telephone men will see quickly enough where the carpenter we mention was in the wrong, but how about a few of the things that go on in a telephone exchange? Quite a few wire chiefs, when there is a rush of work, have been known to send men out on a trouble after making the roughest kind of a test. That is one way to substitute a conjecture for a measurement. The wire chief takes the chances and the troubleman wastes the company's time. The wire chief pays for his carelessness in the same way that the carpenter does, too. The man is going to call in, perhaps, from four or five locations and call for repeated tests and instructions. Finally, when he does locate the trouble, he is more than likely to be so discouraged that he will fix it up in some slipshod fashion and let it go. He can rely on the wire chief to make a perfunctory test and not detect his poor work. Of course he is to blame for doing a thing like this, but the responsibility really rests rather heavily on the wire chief who started him wrong.

Then there is another kind of wire chief who is pretty good with his instruments. He locates a trouble—gets it down fine—and jumps on a troubleman, stirs him up and starts him off with half a kit of tools to get that trouble fixed up as soon as possible. Then he takes up the next ticket. The trouble it indicates is not a difficult one to locate. It calls for no fine work with the test set, but is on the line of an influential citizen who has a reputation as a "kicker." Of course it would have been good policy to look out for this man first, but the troubleman has gone. Another case where the job wasn't properly measured before the timber was cut!

Of course this goes through all departments when it is present at all. It is also a weakness that every organization has to guard against. The thing is for each individual to recognize it in himself. Quite a number of managers who read this will probably say we have hit off their wire chiefs rather sharply; but we would like to see a few wire chiefs write in and tell us what to say about the manager, the next time we take a shot at this particular mark.

THE NEW YORK STATE CONVENTION.

ATTENDANCE at the convention of his State association, to be held in Syracuse on September 25th, is the thing which should now be decided upon before anything else by every Independent telephone man in New York. Last year the convention was notable for the practical and business-like character of a number of important projects which were set in motion. The members who were present then should be sufficiently interested now to go to this convention and see what progress toward the perfecting of the State organization has been made and will be in evidence. Some men who have been called upon to aid the association owe it to themselves to go and receive the hearty handshake of their associates; and if there is anyone who has been too busy to give his first and best attention to a call from the State officials whom he helped choose to work for the common good he certainly owes it to himself to go. That sort of a man will have to go, anyway, to set before his associates an excuse to square himself.

This is only the direct personal side of the case. As a matter of fact there are not many good telephone men in the whole State who have not already decided to take part in this convention. New business in which all sections of the State are interested will be taken up and probably carried to important conclusions. Questions appertaining to operating methods will be discussed in such a way as to bring out the latest ideas which have proven beneficial to the best interests of the companies of the State. Those who know the officers of the association are perfectly confident, too, that everyone who goes to the convention will not only come away a big gainer in a knowledge of his business and in that enthusiasm which is often more powerful than much knowledge, but will also thoroughly enjoy every feature of the meeting.

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The Law in Telephonic Affairs

CONDUCTED BY A. H. McMILLAN.

DOES ANTI-PASS LAW ANNUL TELEPHONE FRANCHISE?

Under the new Anti-Pass Law of Texas all subscribers must be equally charged for any class of services.

Heretofore it has been the custom of both the Southwestern and the Home telephone companies to furnish free telephone service in the city's schools and in several of the city's officials' offices. The former company a few days ago notified the board of trustees of the schools that regular rates would be charged for these telephones. The board decided to dispense with the service and accordingly the telephones were ordered out. The Home company is still furnishing the service free of charge and claims that under the franchise granted by the city it is forced to donate this service. The franchise provides that the company is to furnish six free telephones to the city as long as it operates here. Three of the telephones are in the city school buildings, one each in the office of the mayor, the city secretary and the fire station.

Will the new law annul the contract mentioned in the franchise, so that the new company will be relieved of its franchise obligation to give free telephones? Or will it annul the whole contract and make the franchise of no effect? Please give us your views on the subject. M. A. R.

THE law mentioned will not operate to annul any valid contract because if it did so it would be contrary to the constitutional provisions forbidding the States to pass any law impairing the obligation of contracts. The telephone company gets value received for the telephone service it furnishes in accordance with the provisions of the franchise, the privileges granted by the franchise being the consideration. A court would not say that the privileges given by the franchise were of less value than the established charge required of other patrons of the telephone company.

APPLICATION OF TEXAS ANTI-PASS LAW TO TELEPHONE COMPANIES.

(1) Orphan Homes and other charitable institutions are exempt from the application of the Anti-Pass act as applied to railways and express companies. Would such together with the Y. M. C. A. and other quasi-eleemosynary and charitable institutions be exempt from this law as applied to telephone and telegraph companies? B. A.

CHARITABLE and eleemosynary institutions do not come within the exemption when applied to telephone and telegraph companies, but only come within the exemption when applied to "steam or electric or interurban railway companies." In our opinion the law would prohibit telephone and telegraph companies from granting special privileges to any charitable or eleemosynary institutions of any kind.

(2) Our companies, while separate organizations, work as one system in the division of traffic in the transportation of any messages from one part of the State to another, and in some instances the messages will pass over the lines of several corporations. To illustrate: A message from Houston to Fort Worth passes over the lines of one company as far as Temple, another from Temple to Hillsboro, another from Hillsboro to Fort Worth. Our arrangements provide, as do the railroads, to join traffic, and to do so it is absolutely necessary for the offices, agents, and employes to converse over this entire distance to make the systems practicable, as we could not do a telephone business with operators repeating at each intermediate point. The question is, have the agent of the joint companies and the agent of one company the right to the use of the line clear through other than the line they work for?

Applying the provisions of this act to the facts as stated in the above query, presuming that all things as stated are necessary for the proper transmission of the messages, it is our opinion that "the agents of the joint company and agents and employees of one company would have the right to use the line clear through," as well as the line on which they work.

(3) Are we to understand from this act that all subscribers, local as well as long distance, must pay the same compensations for the same or a like kind of traffic or service under substantially the same circumstances and conditions; that is, are we allowed to make one rate to one man and a different rate to another man in an exchange for similar or like kind of service?

To our mind there is no question that all subscribers, local, as well as long distance, must pay the same price for the same or like service under the same circumstances and conditions, and you would be violating the law to make a greater or less rate to one person than to another in an exchange for a like kind of service.

AVOIDING INTERFERENCE OF LIGHT WIRES.

We have two cables about one mile long each, which are about five feet above the light wires which carry 220 volts, D. C. This, of course, does not interfere with our service to any great extent, but now the light people are contemplating putting 2200 A. C. in place of the present current, and this will no doubt make our lines very noisy and interfere with our service a great deal.

When we built the telephone exchange the light people said nothing about raising their voltage, and of course we did not expect them to do so.

Now the question is this: can we, in any way, prevent them from interfering with our service? Can we compel them to take alleys or other streets with their high tension current? Will you please cite us to cases of this kind. B. B. B.

YOU certainly have the right to prevent the electric light company from interfering with your service by stringing its wires so near the line as to make your lines noisy. We do not know enough of the circumstances to say whether you can compel it to take alleys or other streets with its high tension currents, but you can at least make it take the other side of the same street. It is generally understood that electric light wires carrying high tension currents are exceedingly dangerous, and that overbuilding a telephone line with an electric light line is not a proper method of construction. Simmons vs. Southern Gas, Electric & Power Co., 41 S., 248; Nebraska Telephone Co. vs. York Lighting Co., 43 N. W., 126; Western Union Telegraph Co., vs. Gurnsey & Scudder Electric Light Co., 46 Mo. App. 120, 3 Am. Elec. Cas. 425; Harris Electric Light & Ry. Co., vs. Southwestern Telegraph & Telephone Co., 55 Am. Elec. Cas., 262; Joyce on Electric Law, section 517.

COUPON SELLING AND THE ANTI-PASS LAW.

It has been the custom of telephone companies to sell coupons good for payment of toll charges at a reduction of 25 per cent. to persons who buy as much as $150 worth of these coupons. This right was open to anyone who wished to buy this number of coupons and take advantage of the 25 per cent. discount in payment of toll charges, but to get the discount requires an investment of $112.50. Is it in violation of section 4, or any other section of the act known as the Texas Anti-Pass law to continue this practice of giving large users a discount? M. L.

WE think it clearly a violation of this law to sell coupons after the manner stated in your question, for the anti-pass act says that "no company shall directly or indirectly by any special rate, rebate, drawback or other device or exchange, demand, charge, collect or receive from any person, firm, association or persons, or corporation a greater or less, or different compensation for any service rendered or to be rendered in the transportation of messages than is charged, demanded, collected or received from any other person, firm, association of persons, or corporation for rendering a like service."

NORTH CAROLINA CORPORATION COMMISSION SUSTAINED.

THE Supreme Court of the United States has refused to interfere with an order of the North Carolina Corporation Commission regulating the train service of connecting railroads, on the ground that the question of whether the order was arbitrary and unreasonable was a local and not a federal question. This decision is of interest to the telephone companies of the state because the commission has authority over telephone companies similar to that which it has over railroad corporations. The Court also held that the power of the state to regulate railroads extends to furnishing the public reasonable facilities for making connections between different carriers. This case may have an important bearing upon the interpretation of state laws requiring connections to be made between telephone companies.

Atlantic C. L. R. Co. vs. N. Carolina Corp. Com., Adv. Sheets of U. S. Sup. Ct., June 1, 1907. Page 585.

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News from Operating Centres

NEW YORK INDEPENDENT TELEPHONE ASSOCIATION TO MEET AT SYRACUSE ON SEPTEMBER 25TH.

THE headquarters of the New York State Independent Telephone Association during the annual convention on September 25 will be at the Independent Telephone Building, Syracuse, as announced by Secretary R. M. Eaton, of Niagara Falls.

Many important matters are to be discussed, and the members are already signifying their intention of going to the meeting in considerable numbers. Plans are being made to more thoroughly organize the State and to rearrange the district associations.

TEXAS ATTORNEY GENERAL GIVES OPINION ON APPLICATION OF ANTI-PASS LAW TO TELEPHONE COMPANIES.

THE Attorney General of Texas has made a ruling relative to the anti-pass law which is expected to be far-reaching in effect. The law provides among numerous other things against discrimination, and the Attorney General says that a telephone company shall not charge more in one town than in another of like size, under similar conditions.

This will end the rate war that the Bell Company has always entered into where there was competition. Now it must either increase its rates where it has competition, or lower them where there is no competition.

It appears that this anti-pass law is going to prove very favorable to the Independent interests, as it takes all the fight out of the Bell Company by doing away with its principal ammunition. Under the Attorney General's ruling there can be no free telephones to any persons under any conditions. There can be no coupon books sold at a discount for long distance business, no complimentary long distance or local service, no reduction in any of the rates for any minister, politician or friend.

The Dallas *News* says in part: "It is a most important ruling, as it will enable the Independents to flourish, and will also bring relief to patrons in towns where there is no competition."

DISTRICT MEETINGS OF THE INDIANA ASSOCIATION.

AT a recent meeting of the executive committee of the Indiana Independent Telephone Association arrangements were made for the holding of a district meeting in each of the eleven districts during the month of September.

The question of the attitude of the Independents toward the alleged proffered consolidation of local exchanges with the Bell company having been firmly settled in the negative by the annual meeting, other subjects more intimately related to operation will be discussed at the district meetings.

District secretaries have been requested to secure statistics relative to the ratio of expense to income of the most successful companies, in order to show what per cent. of the gross income may be safely devoted to each department of expense. The condition of the Independent companies of Indiana is said to be very satisfactory and the future exceedingly bright.

TELEPHONE COMPANIES AND LABOR TROUBLES.

AT Helena, Montana, a suit was commenced by the Rocky Mountain Bell Telephone Company against the Montana Federation of Labor, the Trades and Labor Council, Telephone Operators' Union No. 42, and several individuals to secure an injunction restraining the respondents from interfering with the company's business and to end the boycott which, the complaint alleges, has been in force since last March, and which is said to have damaged the company to the extent of $5,000. The particular act complained of is that the defendants printed and distributed handbills which reflected on the good will of the company, with the intention of inducing its customers to withdraw their patronage. The situation at Helena is further complicated by a mandamus proceeding instituted by the Helena Cab Company to compel the Rocky Mountain Bell Telephone Company to furnish telephone service to the public. It is understood that the company is loath to bring in outside operators and may be forced to do so in order to comply with the mandate of the Court.

At Wheeling, W. Va., the National Telephone Company obtained an injunction against the Ohio Valley Trades and Labor Assembly, and the editor of a labor paper, called the "Working Majority." This injunction was very broad in its scope, enjoining strikers and their friends and assistants from even discussing the strike with the employes of the telephone company. The labor leaders, by their counsel, have demurred to the bill of complaint and threaten to fight the case to the bitter end.

CITY OF PASADENA, CAL., ATTEMPTS TO FORCE BELL COMPANY TO OBTAIN FRANCHISE.

THE city attorney of Pasadena, Cal., is much aroused by the refusal of the Pacific Telephone and Telegraph Company to take out a franchise in that city. The present controversy is said to be the outgrowth of a systematic effort of the Bell company to ignore the rights of municipalities to interfere with the privileges which it claims under a charter to do business in the State of California. The company claims that the latter is broad and specific enough to justify its operation without interference from the various towns, cities and counties in which its business must necessarily be transacted. The city attorney of Pasadena does not agree with this view, however, and advises the council to remove the poles and wires of the company from the streets and to refuse all permits to occupy the streets and alleys until the company applies for a franchise. In the report furnished to the city council in response to a request for advice concerning its rights the attorney says in part:

"The right to use the streets for the purpose of erecting poles and stringing wires for telephone purposes is not possessed by any persons or corporation as of common right. It is a special privilege which can only be enjoyed by special grant from some authority having control of the streets, and this privilege unquestionably has a large commercial value. The right to make any such grant resides exclusively with the city of Pasadena through its council. Under these circumstances the Pacific Telephone and Telegraph Company, operating the local or State telephone system operated by the Sunset Telephone and Telegraph Company, should be required to secure a franchise from the city and pay to the city the value thereof.

"Except under such franchise any poles or wires placed in or over the streets in the city of Pasadena and used for telephone purposes or for telegraph with the State of California constitute nuisances, which may be summarily abated by the city. Unless the owners remove them the city may do so without any liability to such owners and may recover the expense of such removal from the company."

The attorney goes into the details of the case and cites numerous decisions and legal precedents for his advice.

Before taking the drastic action advised by the city attorney the council will further consider the case, but in the meantime the council adopted the following resolution:

"That the city engineer and street superintendent and each of them be ordered to issue no permits to the Sunset Telephone and Telegraph Company or the Pacific Telephone and Telegraph Company for the purpose of placing any poles or wires upon any of the streets of Pasadena or the excavating of any of the said streets."

The attorney was also instructed to draw up and present to the council a draft of any further resolutions he may think necessary in the premises.

Under a law passed in recent years by the State Legislature of California all franchises granted public service corporations

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"THE ORIGINAL GRAY."

Gray Pay Stations Pay

165,000 of our Stations in use is our Best Indorsement.

They are Automatic—no Levers or Springs.

GRAY TEL. PAY STATION CO.

HARTFORD, CONN.

We send Catalogue on request.

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

EIGHT HUNDRED 35-foot cypress poles, 7 inch tops for sale; cheap. Address, Home Telephone Co., of Albion, N. Y. 921

FOR SALE.—Telephone plant of 200 telephones; plant is in first class shape throughout: have toll lines to all surrounding points; located 65 miles northwest of Chicago. Address, Box 920, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 920

FOR SALE.—100 drop, ten cord, metallic, magneto switchboard, having full equipment carefully selected apparatus for practical exchange work. Used only for exhibition and in excellent condition. Handsome oak cabinet. Bargain and good as new. Address, Box 917, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 917

FOR SALE—Four telephone exchanges and three hundred miles of country toll lines. A splendid investment for any one desirous of locating in the south. For information write H. Susman, Washington, N. C. 898

FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

TELEPHONE EXCHANGE FOR SALE.—In good Oklahoma town; population 5,000; County seat; College town; 270 residence and 85 business phones; rates $1.50 and $2.50; good long distance connections; terms favorable; write Tate & Clement, Norman, Oklahoma. 916

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—A position as manager or superintendent of construction by man of sixteen years' experience, eight years on construction, two on switchboards and instruments, two as local manager, and four as district manager. Best references and can furnish bonds, know how to handle men and money. Thirty-three years old and married. Address Box 911, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 911

WANTED---Continued

WANTED—Position as manager by man with several years' telephone experience. Am at present employed by Bell company, but have good reason for changing. Capable of managing a good exchange and can furnish best of references. Address, Box 918, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 918

WANTED—Young Telephone Engineer desires position as Manager of an Exchange from 500 to 3,000 subscribers. Capable of handling the business as well as electrical end. Six years' experience in all branches of telephone work. Technical graduate. Address Box 905, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 905

CABLE SPLICERS furnished, familiar with both telephone and electric, all with at least five years' experience. Address Box 895, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 895

COMPETENT switchboard and construction man has few months between positions during which period he will install or overhaul central office equipment. Permanent position not desired. Address Box 909, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 909

WANTED—Position with telephone company east or central west. Fifteen years' experience as general foreman of construction and maintenance of lines. Address, Box 901, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 901

WANTED—Position in Engineering Department by experienced man familiar with modern methods in exchange cable and pole line construction. Best of references. Address Box 904, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 904

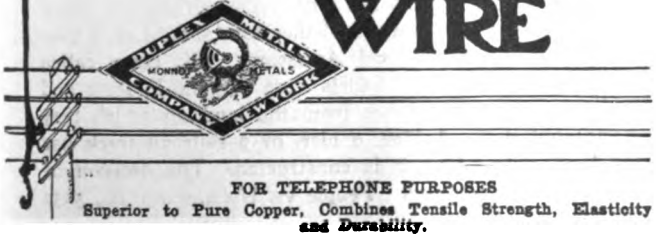
YOUNG man, married, employed in responsible semi-executive position, desires change on account of present work too confining. Eight years' experience in installation, maintenance, construction and traffic work. College education (technical). Able to handle men. Address, Box 919, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 919

OFFERS.

OFFERS addressed to the undersigned will be received up to noon on Monday, the 16th day of September, 1907, for the furnishing of such telephone equipment and construction material as will be required from time to time in country exchanges to be built in the Province of Manitoba.

Detailed information including specifications may be had upon application. J. H. Howden, Minister of Railways, Telephones and Telegraphs, Winnipeg, Manitoba, Canada. 903

MONNOT COPPER-CLAD WIRE COSTS LESS AND IS SUPERIOR



FOR TELEPHONE PURPOSES

Superior to Pure Copper, Combines Tensile Strength, Elasticity and Durability.

to Pure Copper Wire, as it affords the non-oxidizable, acid-proof qualities of copper—combined with the tensile strength and high elastic limit of steel. This is

Monnot Copper-Clad Wire

(A Steel Wire with Non-porous, Welded Copper Coat.)

Let us send you our booklet. It tells the story.

DUPLEX METALS COMPANY

208 Fifth Avenue, New York City

WORKS AT CHESTER, PA.

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must contain a clause providing for the payment of 2 per cent. of their gross earnings to the city granting the franchise. This is one of the principal reasons why the Pacific Telephone and Telegraph Company does not want to be compelled to take out a franchise.

LATEST NEWS OF INDEPENDENT TELEPHONE PROGRESS IN MEXICO.

By "Noleye."

IN Mexico City the Ericsson (Independent) Telephone Company is making rapid progress. The new central battery transfer board system, called the "Hague system" with some improvements, works admirably. About 200 instruments are working and subscribers are being connected up at the rate of fifty per week now. There was some delay in connecting up lines on account of the destruction of several of the principal 600 pair cables through electrolysis in a certain street where the traction company's rails were not properly bonded. This difficulty has been settled. The street car company is now overhauling all its rails and bonding them with copper cable. In one street particularly exposed to electrolytic effects the cables have been laid in asphaltum and the work of connecting up of subscribers is now progressing rapidly.

Suburban and outlying towns of the Federal District are not neglected. Substantial trunk lines have been built to the towns of Guadalupe (6 kilometers), Tlalpam (24 kilometers), Tacubaya (8 kilometers) and others are in course of construction. The total network of suburban lines when finished will extend over an area of 59 by 35 kilometers and supply about twenty of the more important towns, besides many industrial establishments and haciendas.

The central office service is rapid and conversation is as near perfect as could be desired.

Messrs. De Corbera and Sitzenstatter's underground system in the important seaport of Vera Cruz is progressing well. About 3,000 meters of underground ducts have already been laid down under the supervision of the well-known contracting firm of P. M. Bennett y Cia, of Mexico City, who have laid down over fifty kilometers of ducts of all kinds for the Ericsson company in Mexico City and almost all the underground work of the electric light companies in that city as well as in Vera Cruz. It is asserted that the telephone work here will stand favorable comparison with any installation of the kind in the world. The glazed clay ducts are imbedded in 3-inch best Portland cement over all and form perfectly true lines between the pits, enabling anyone to see daylight through the orifices. The pits are of concrete and commodious. The present layout had to be made rapidly, in order to keep ahead of the Asphalt Paving Company, and comprises the business center of the port. The second layout is already handed over to the contractors and will be begun as soon as the rainy season is over, about the end of September. The immediate outfit will be for 750 subscribers, but considering the enormous development of the business all over the republic this number will probably be doubled before many years, and therefore provisions have been made to provide for ten times that number without interruptions to the service or great extra cost. As soon as Vera Cruz is installed the cities of Orizaba, Cordoba and Jalapa (the latter the State capital) will be connected up. Negotiations are now pending for the installation of switchboards in Vera Cruz.

CUMBERLAND COMPANY STILL STRUGGLING AGAINST COMPETITION IN NASHVILLE.

ANOTHER bill has been filed in the Chancery Court at Nashville, Tenn., seeking to defeat the plans of the Home Telephone Company, of that place, by declaring what is known as the Talbert law unconstitutional. The Talbert law was passed by the last Legislature and provides that a city cannot refuse a franchise to a public service corporation, such as telephone and telegraph companies. The Home company had been fighting against the Cumberland Telephone and Telegraph Company in its home city for two years, but was defeated on every hand and the Cumberland company was given a perpetual and exclusive franchise so long as it paid the city a tax of $10,000. During the last Legislature the friends of the Home Telephone Company introduced a bill providing for the new law, and, after a hard fight lasting through the legislative recess, the bill was passed by a good majority. This gave the Independent company all the rights it desired in Nashville.

Representative Marr, a member of the Legislature who had fought the bill, immediately asked the court to declare the law unconstitutional and restrain the Secretary of State from issuing a license to the new company. This injunction was dissolved or disallowed by the court and it looked as if the Home company would have its way. Mr. Marr has come up with a new set of complaints against the law, however, and seeks to have the court act on the question again. The bill asks that the law be declared unconstitutional on the ground that it grants a perpetual franchise to the company and also that the Secretary of State, John W. Morton, was one of the incorporators of the new company. He charges also that no law is constitutional which takes the right from a city to attend to its own affairs. The case will come up for hearing at the October term of court when an interesting contest is expected.

BELL COMPANY REQUIRED TO OPEN OFFICES CLOSED ON ACCOUNT OF STRIKE.

SINCE the operators at Helena, Montana, have been out on a strike the offices of the Bell company have been closed. Judge C. T. Bach, on petition of the Helena Cab Company, granted an order compelling the company to open its exchange and give service. Judge Bach said that it did not concern the court what the company had to pay its employes; but that, as a public utility corporation, it must operate its lines regardless of the cost involved.

RIGHT TO USE CHICAGO TUNNELS HELD ASSESSABLE AS REAL ESTATE.

THE laws of Illinois declare that any tangible property of corporations such as telegraph and telephone companies should be assessed by the Board of Equalizations, and that tangible property, including real and personal property of such corporations, shall be assessed by the Board of Local Assessors. The statute defines real property for the purpose of taxation and not only the land that it is on, but also all permanent fixtures of whatsoever kind, and all right and privileges belonging or in any way pertaining thereto, except as otherwise denominated by the act. Hurd's Rev. St. 1903, c. 120, sec. 292, par. 12. The question arose whether certain tunnels constructed beneath the surface of certain public streets in the city of Chicago should have been assessed under these laws, and the city brought suit for mandamus to compel the Board of Review of Cook County to include tunnels belonging to the Illinois Telephone and Telegraph Company and the Illinois Tunnel Company in their assessment. The petition of the city was demurred to upon behalf of the company. The demurrer was sustained in the lower court, but overruled in the Supreme Court of Illinois.

The court held that tunnels fell within the designation "Real property," as used in the statute, and therefore should have been assessed by the Board of Local Assessors. The court called attention to the fact that the tunnels were tangible in form and had the same separate existence from the land on which they were constructed that a bridge, a pier, or a railroad track has from the land upon which it is constructed. The decision of the lower court was reversed. People vs. Upham, 221 Ill., 555; 77 N. E., 931.

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READ THIS OPEN LETTER FROM ONE OF OUR SATISFIED PHANTOM TRANSFORMER USERS

UNITED STATES LONG DISTANCE TELEPHONE AND TELEGRAPH COMPANY
CURRIER BUILDING

LOS ANGELES, CALIFORNIA, APRIL 24, 1907.

The L. M. Ericsson Tel. Mfg. Co.,
Buffalo, N. Y.

Gentlemen:—

I have yours of the 16th requesting me to give you some information regarding the way in which we use your phantom transformer.

I have to advise that we find we get excellent service for phantom purposes by simply cutting in a coil on each end of the two lines which are to be phantom and connecting the phantom telephones to the fifth binding post on each coil. Of course, it is necessary for us to select two lines which are well balanced throughout, that is all four wires must be of the same size and of the same material and each side of the same length.

We transpose the two circuits against each other about every two miles and find this gives us excellent results in keeping the line free from noise and induction.

Other than the coils and these special transpositions we use no equipment whatever for our phantom lines and we have yet to hear of our first complaint of them.

We wish to congratulate you on the perfect balances you secure in your coil from the central tap of the secondary to each of the other terminals as we have found them to be absolutely perfect.

Any further information we can give you we shall be only too happy to do so.

Yours very truly,
C. H. Temple
Manager.

It's all in the "Ericsson Workmanship"

L. M. ERICSSON TEL. MFG. CO.
BUFFALO, N. Y.

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Patents on Telephonic Inventions

METHOD OF LAYING UP CABLE.

W. Dieselhorst, Old Charlton, and A. W. Martin, London, England, patent 863,969, August 20, 1907.

This patent describes a method of laying up conductors into cable form so as to eliminate the crosstalk between pairs and consists in twisting together pairs of individual conductors with a constant length of lay from end to end. These pairs are then twisted together with a different length of lay and so on until a cable of the required size is obtained.

TELEPHONE REPEATER SYSTEM.

N. G. Warth, Columbus, Ohio, patent 864,713, August 27, 1907.

This patent covers improvements in telephone repeater apparatus as granted to H. E. Shreeve in patents 791,655, 791,656 and 835,037 and a patent granted to Mr. Warth, No. 845,282.

The improvements consist in the arrangement and location of the repeating induction coil windings in the sections of the line circuit, whereby direct through or original transmission from the transmitting station is reduced to a minimum.

SELECTIVE SIGNALING SYSTEM.

S. A. Reed, New York, N. Y., patent 863,875, August 20, 1907.

This system of selective signaling contemplates the use of a direct current at the central office for a source of power. Bridged across its terminals are a resistance and a vibrator, so arranged that when current is impressed upon the line it will flow through the ringers of the subscriber's instruments, charging the condenser in series therewith, so as to cause an actuation of the armature of the ringer of the proper polarity.

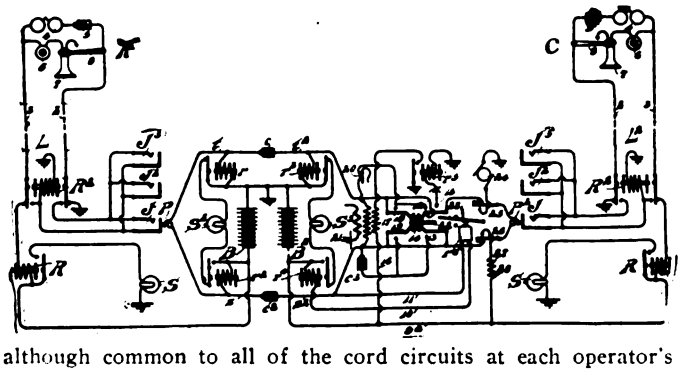
The vibrator at the central office, which is connected to one side of the line, connects alternately with the source of power and the resistance bridged across its terminals. This causes first the condenser to be charged and the ringer to be actuated, then a discharge of the condensers through this resistance and their return to normal, whereupon the vibrator again comes in contact with the battery connection. It re-charges the condensers and causes another stroke of the bell. This action takes place so rapidly as to cause a continuous ringing of the bell at the desired station.

SYSTEM OF TESTING TELEPHONE LINES.

W. W. Dean, Chicago, patent 864,454, August 27, 1907, assigned to K. S. & S. Co.

The system described in this patent comprises modifications in patent 12,090, issued to Mr. Dean, March 3, 1903.

In this case the test relay r^3 of high resistance and impedance,



although common to all of the cord circuits at each operator's position, is normally disconnected from the cord circuits.

Special springs 12 and 23 are provided on the operator's key 14, by means of which she may connect this test relay, r^3, with the cord circuit so that by touching the tip of plug P^2 against the sleeve of the jack J she may ascertain whether a line is busy.

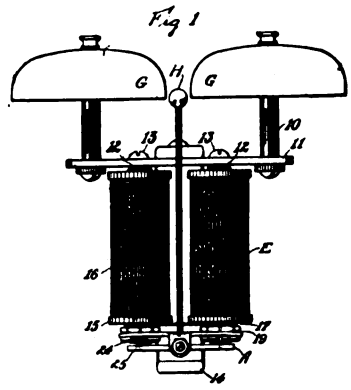
The advantage claimed by the inventor for this arrangement over the one described in patent 12,090 is that in case one of the cord circuits becomes short circuited, or if there is a general leakage in all of the cord circuits on one position the test relay will not be actuated and throw the whole position out of service.

TELEPHONE RINGER MOVEMENT.

W. Kaisling, Chicago, patent 863,720, August 20, 1907, assigned to M. G. Kellogg.

This invention relates to the construction of polarized ringers, and particularly to the means provided for adjustment of the armature A and bell hammer H.

The cores 12 of the magnet coils E extend beyond the end 15



sufficiently to allow the armature retaining portion 19 to be held in place thereon by the nuts 24 and 17.

As the cores 12 are threaded the entire length of their extension, the nuts 24 and 17 may be moved up or down this extended portion to any point desired. This effects an adjustment of the armature A in relation to the poles of the magnet.

AUXILIARY HOOK SWITCH.

A. S. Perry, Yukon, Okla., patent 864,332, August 27, 1907.

This patent covers a device intended to make it possible for a person to "rubber" on a busy line without notifying others of his presence by a click due to closing the transmitter circuit.

APPARATUS FOR SIGNALING FROM MOVING TRAINS.

A. D. Jones, Louisville, Ky., patent 863,609, August 20, 1907, assigned to T. Harris, and others.

The apparatus described in this patent comprises a pair of brushes having metallic bristles, mounted on an adjustable arm pivoted on the front cross beam of a locomotive. A rope extends into the engine cab, by means of which the brushes may be made to come in contact with a pair of wires mounted alongside of the track when communication is desired.

The metallic brushes are kept moist by steam, which passes over a soluble chemical held in a suitable receptacle, for the purpose of increasing their conductivity.

COMBINED DROP AND JACK.

J. M. Overshiner, Chicago, patent 863,629, August 20, 1907.

This patent covers a form of combined enclosed drop and jack so mounted together as to constitute an individual unit to be mounted separately in a telephone switchboard. Aside from the compactness and method of mounting the salient feature of the invention is a small cam arranged under the drop shutter. It is adapted to be actuated by the insertion or removal of the switchboard plug from the jack so as to cause a restoration of the drop shutter to the inoperative position.

ELECTRICAL TRANSMISSION OF INTELLIGENCE.

Isidor Kitsee, Philadelphia, Pa., patent 863,852, August 20, 1907.

In this patent is described a method whereby communication may be held between two distant telephone stations having but one metallic line with no earth connection between them.

The underlying principle is the employment of a local artificial line joined together by condensers and shunted with the aid of magnetic coils in order to build up a line of value equal to or higher than the line joining the two stations.

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The Circulation of American Telephone Journal is Greater than the Combined Circulation of All Other Telephone Papers in the World

Advertisers advertise for results. They don't particularly care what the circulation of any paper is so long as they receive inquiries and that these inquiries are from a class having the purchasing power.

A publisher, if his conscience is easy, can claim anywhere from six to nineteen thousand circulation for his paper, even if it is only four thousand or less a month. And this claim may influence a few concerns that don't take the trouble to look into the merits of the paper and consider it from the real circulation basis—strength of the reading pages, and their interest to the buyers of the class reached.

Such a publisher may even issue a *sworn* statement, backed up by a printer's *sworn* statement. A sworn statement is good so far as it goes.

But such a sworn statement shows only the number of copies printed.

It doesn't satisfy an advertiser as to the number of copies circulated and the number of readers of the paper.

For these reasons AMERICAN TELEPHONE JOURNAL has never issued sworn statements and has had little to say about *quantity* of circulation—dwelling on *quality* principally.

United States Post Office receipts are the only unfailing evidence of actual circulation within the United States, its possessions, and Mexico.

Probably the publishers of AMERICAN TELEPHONE JOURNAL would not have gone into this circulation talk at all had it not been for the action taken at the last meeting of the TELEPHONE MANUFACTURERS' ASSOCIATION.

At this meeting, the following resolution was passed:

"RESOLVED, that the President of this Association be directed to secure properly audited reports of the circulation of the different telephone trade journals and report at the next meeting of this Association."

AMERICAN TELEPHONE JOURNAL received a copy of this resolution on August 21st. It was accompanied by a letter dated August 19th, from the President of the TELEPHONE MANUFACTURERS' ASSOCIATION, which letter presumably was sent to the other telephone journals.

The letter follows:

"The writer respectfully requests that you forward a certified copy of Post Office receipts for the second week in *August* and statement showing number of paid subscriptions at that date.

"The members feel that in buying their advertising they should be correctly informed as to the circulation of the several publications.

(Signed) "J. G. IHMSEN,
"President Telephone Manufacturers' Association."

By return mail the President of this Association was forwarded the POST OFFICE RECEIPTS of AMERICAN TELEPHONE JOURNAL not alone for the second week in August, but for all the issues in that month up to the receipt of the letter. Those receipts are now in the hands of the President of the Manufacturers' Association, and no doubt can be seen by any advertiser interested. (Post Office receipts for the remaining August issues of American Telephone Journal have since that time also been forwarded to the Association President.) They were accompanied by the following letter, mailed within two hours of the receipt of Mr. Ihmsen's request:

"Answering your favor of the 19th asking for a certified copy of the Post Office receipts of AMERICAN TELEPHONE JOURNAL for the second week in August, we beg to hand you herewith the ORIGINAL post office receipts for our issues of August 3d, 10th and 17th. The original Post Office receipts for the issues of August 24th and 31st will be forwarded to you as soon as received by us.

"Canadian and Foreign circulation IS STAMPED. Our PAID circulation is 4,643.

"The AMERICAN TELEPHONE JOURNAL heartily endorses the policy of your association in seeking information as to the circulation of the telephone press. If any other information on the subject of circulation is desired, the writer will take it as a favor to be asked to attend your next meeting.

"AMERICAN TELEPHONE JOURNAL.
(Signed) "W. H. McDonough, Pres't."

In response to this letter we were in receipt of the following acknowledgment:

"The writer begs to acknowledge your esteemed favor of the 21st inst. enclosing post office receipts as stated.

"The members will be pleased to learn that you favored their desire for a wider knowledge of conditions as they exist, and I wish to thank you personally for your prompt reply.

(Signed) "J. G. IHMSEN,
President, Telephone Manufacturers' Association."

The Post Office receipts forwarded to Mr. Ihmsen showed that the copies of AMERICAN TELEPHONE JOURNAL mailed to readers in the United States and Mexico during the month of August weighed 8,112 pounds, or over 4 tons.

Each copy of the JOURNAL with WRAPPER weighs on an average 4.8 ounces.

So that the POST OFFICE RECEIPTS forwarded to Mr. Ihmsen show that 27,040 copies of the Journal were mailed during August to readers in the United States, its possessions and Mexico.

This circulation is GUARANTEED BY THE UNITED STATES GOVERNMENT.

But in addition, the publishers have forwarded to Mr. Ihmsen a certified statement from AMERICAN TELEPHONE JOURNAL'S printer and also from a public accountant.

Copies of the Journal mailed, with stamps affixed, during August to readers in Canada and other foreign countries, and sales to news companies, brings the actual circulation of the Journal up to the splendid total of 30,244 copies.

This is why the following line will appear regularly on the front cover of the Journal:

THE CIRCULATION OF AMERICAN TELEPHONE JOURNAL IS GREATER THAN THE COMBINED CIRCULATION OF ALL OTHER TELEPHONE PAPERS IN THE WORLD

WARNING TO ADVERTISERS

The Telephone Manufacturers' Association asked for circulation figures for the month of AUGUST.
It did not say anything about September or last January or next December.

The resolution and Mr. Ihmsen's request came without warning to any of the telephone publications. The figures given by American Telephone Journal show its AVERAGE CIRCULATION AND NOT A SPECIAL CIRCULATION MANUFACTURED FOR A SPECIAL PURPOSE AND GOTTEN UP AFTER THE PUBLISHER HAD A CHANCE TO PREPARE FIGURES.

Insist on Seeing the Figures for the Month of August

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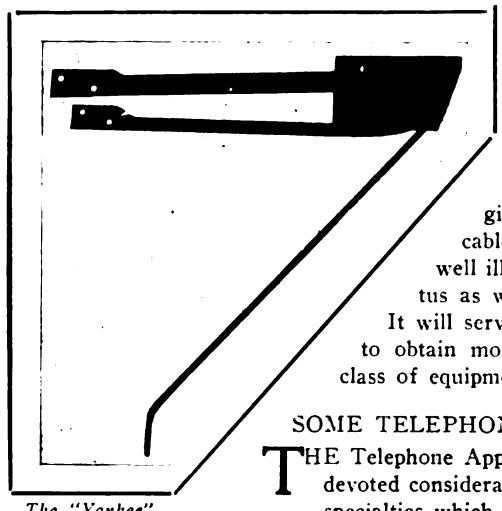
Telephone Products and Sales

AN INDEPENDENT TELEPHONE FACTORY FOR CANADA.

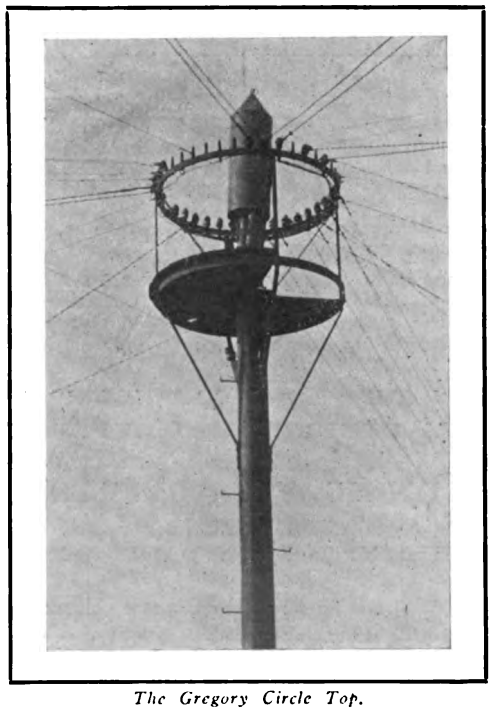
CANADIAN operators of Independent telephone lines have been in the habit of purchasing the greater part of their material from manufacturers in the United States. This practice is due to the fact that at the present time there is no established factory for the manufacture of telephones, telephone switchboards and other apparatus necessary for equipping telephone exchanges in a complete fashion located within the Dominion. One of the handicaps to the charging of low rates brought about by this condition is that the laws of the Dominion require the payment of a 27½ per cent. duty on imported telephones, and many Canadian Independents are eager to purchase at more favorable prices than they can obtain at present.



The "Yankee" Seat.

The Dominion Telephone Manufacturing Company, Ltd., Toronto, Canada, which has just been organized, is expected to start in to meet the exceedingly large and rapidly growing demand for Independent telephones in Canada at an especially auspicious time. The new company is capitalized at $250,000, $100,000 being preferred stock and $150,000 common. It expects, as soon as its factories are completed and in operation, to start in a field which is at present unoccupied and will push vigorously the manufacture and sale of Canadian telephones and telephone apparatus to the Canadian Independent market; it will also seek the business of other portions of the British Empire.

This company will be closely affiliated with the Swedish-American Telephone Company, of Chicago, Ill. Mr. E. B. Overshiner, president of the Swedish-American Telephone Company, who has within the past few years made himself, his organization and his goods extremely well known throughout the United States, is the leading spirit in the new company and holds the office of president. He expects that the Dominion Telephone Manufacturing Company will be ready for practical work at an early date. It will start in operation aided by the strong backing of the Swedish-American Telephone Company, which will furnish to the fullest extent all the information derived from its own experience during its years of very successful business. The new company will thus avoid the danger and expense involved in the development of new apparatus and shop methods. On the other hand, the Canadian operating companies may expect to secure advantages derived from the ability to purchase goods of a Canadian manufacturer which they may be assured will be similar to goods of a like design which have received an extensive trial by operating companies in the United States.



The Gregory Circle Top.

A booklet has been prepared which tells of the plan of organization of the new company and describes the opportunities for the sale of its products. This book gives the terms on which subscriptions may be made for stock in the company and refers to some very obvious benefits which may be derived by persons interested in Independent telephone systems through the ownership of stock in the manufacturing corporation. The character of the new enterprise is indicated by a large number of letters from officials of prominent banks and manufacturers, which give strong testimony concerning satisfactory business dealings with Mr. Overshiner and the success of the company which he has built up in the United States. Persons interested in the plans of the new company can obtain copies of the booklet above referred to by addressing a request to Mr. E. B. Overshiner, president Swedish-American Telephone Company, Chicago, Ill.

FRANK B. COOK, 246 West Lake street, Chicago, Ill., has prepared a bulletin giving descriptions of the complete line of cable terminals which he manufactures. It is well illustrated with views of assembled apparatus as well as of fuses and other separate parts. It will serve as a useful guide to persons who wish to obtain more complete information concerning this class of equipment.

SOME TELEPHONE CONSTRUCTION SPECIALTIES.

THE Telephone Appliance Company, Minneapolis, Minn., has devoted considerable attention to the design of construction specialties which are intended to fulfill in an efficient manner all practical requirements and still be low in cost. An example of the construction of its goods is indicated in the accompanying illustration of the "Yankee" seat. This seat is in use by many companies and its manufacturers say that it seems to give good satisfaction. At the same time the simplicity of its construction makes it possible to sell it at a low price. Another of the company's specialties is the Gregory circle top, an idea of the appearance of which may be obtained from the accompanying view. The company manufactures a line of pole fittings and distributing apparatus covering a considerable variety of types and will be pleased to furnish full information concerning any line of appliances to interested persons.

SUMTER TELEPHONE MANUFACTURING COMPANY, Sumter, S. C., is made the subject of a very interesting portion of an article devoted to the important features of the city of Sumter, which appeared in the August number of the *Business Magazine,* published at Knoxville, Tenn. Attention is drawn to the growth of the plant from a small shop, which was started by Mr. C. T. Mason, now president of the company, some time ago. At the present time the buildings occupy a large area and the company is constantly busy turning out all kinds of magneto telephone equipment, instead of the small variety manufactured at first. One of the interesting features of the company's business is that, as it is located in an agricultural country far from other plants manufacturing mechanical equipment, the Sumter company has been obliged to take up for itself the manufacture of each part entering into its telephones. The wood which it uses is shaped and finished in its own mills and shops. Telephone companies reap the advantage of the careful supervision which the company is thus able to bestow upon all

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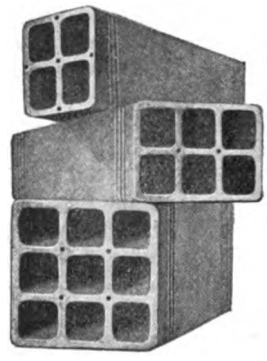
VITRIFIED

CLAY CONDUIT

SINGLE and MULTIPLE DUCT



IMMEDIATE DELIVERY ON ALL STANDARD SIZES

Factories: New Jersey, Pennsylvania, Ohio

Standard Vitrified Conduit Company

Main Offices: 39-41 CORTLANDT ST., NEW YORK, N. Y.

AUGUST EDITORIAL IN A LEADING TELEPHONE JOURNAL

"There is a crying need for more display of the shield. Hundreds of communities do not know what it stands for as applying to the telephone business. Thus the emblem of the Bell Co. has become synonymous of long distance service. The practice should be emulated by the Independents. We can see good reasons for encircling the shield with the words *'Long Distance'* in *bold relief*. It would lend emphasis to the long distance feature and that is the thing to be desired—the use of the signs and other advertising is essential to the best welfare of the Independent progress."

Use These Enameled Signs

Beautifully enameled in three brilliant lasting colors on heavy gauge steel, with words **"Telephone Pay Station,"** not found on any other sign of this style. Design on both sides. Flanged for support.

No. 10—Three Colors—Red, White and Blue
Size, 18 x 19½ inches

NET PRICES

Lots less than 5, each	$1.00
Lots of 15, each	.90
Lots of 25, each	.85
Lots of 50, each	.80
Lots of 75, each	.75
Lots of 100, each	.70

No. 12—Three Colors—Red, White and Blue
Size, 8 x 18 inches

NET PRICES

Lots less than 5, each	$0.65
Lots of 15, each	.60
Lots of 25, each	.54
Lots of 50, each	.50
Lots of 75, each	.47
Lots of 100, each	.45

Central Telephone & Electric Company

Makers of High-Grade Telephone Apparatus. Dealers in Telephone Supplies (Exclusively)

Main Office and Factory:
2131-37 LUCAS AVE., ST. LOUIS, MO.

120 Liberty Street, New York City
105-7 Commerce St., Dallas, Texas

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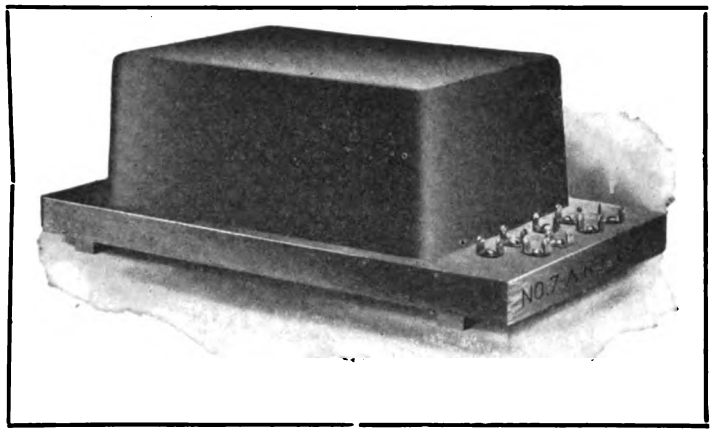
details of workmanship which contribute to the final result. Attention is drawn in the magazine article to the well equipped engineering laboratory, where tests of all apparatus are performed, and also to the policy of the company of putting no new device upon the general market until it has been actually working satisfactorily in the plant of some well-known customer for some months.

THE STROMBERG-CARLSON "RING THRU" COIL FOR CONNECTING METALLIC AND GROUNDED LINES.

THE ordinary repeating coil is generally designed for high efficiency in talking and, as the coil is usually placed in the cord circuit of the switchboard, but little trouble is experienced with signalling on the lines. When these coils are placed in the line wires for phantom work trouble is immediately experienced in signalling from station to station, owing to the fact that the coils are not suitable for repeating the currents for ringing the bells. In winding these coils the various wires are not so related to each other as to entirely neutralize one another, consequently complaints of "cross talk" and "can't ring" are prevalent.

To overcome these difficulties the Stromberg-Carlson Telephone Manufacturing Company, of Rochester N. Y., has designed a "ring thru" coil, known as the No. 7-A repeating coil. The windings and core in this coil are so related that ringing current will be readily transmitted as well as transmitting the voice currents at a minimum loss. This coil contains four windings, claimed to be perfectly balanced, upon a continuous magnetic core of Swedish annealed iron rigidly mounted and sealed in a non-magnetic cast box. Eight terminals are mounted in the base, being plainly numbered to correspond with a circuit diagram furnished with the coil to illustrate the proper connections for phantom and ring thru circuits.

By using these coils additional circuits may be very satisfactorily and economically arranged for relieving overloaded lines.



The Stromberg-Carlson "Ring-thru" Repeating Coil for Connecting Metallic to Grounded Lines.

THE AMERICAN ELECTRIC FUSE COMPANY, Muskegon, Mich., has just put upon the market a new type of individual protector for use out of doors at subscribers' stations. The protective device is mounted in a porcelain case. Connections for fuses are of a new type and are especially designed to give the firmest contact and at the same time make it easy to release and replace the fuses without the use of tools. A lightning arrester having carbon plates which present a large discharge surface is used. The company makes strong claims for the efficiency and durability of this apparatus and is sending out complete information to all inquirers.

RECENT ORDERS FOR DEAN EQUIPMENT.

ORDERS for switchboards have lately been obtained by The Dean Electric Company from companies operating in the following cities: Glouster, Liverpool, Grafton, Wellington, Chardon and Medina, Ohio; Russell, Omemee and Overly, North Dakota; The United Gas and Improvement Company, Philadelphia; Plattsburg, Missouri; Chester, New York; Hubbard City and Whitesboro, Texas; Valina and Saginaw, Michigan; Maynard and Sandstone, Minnesota; Vandalia and Newton, Illinois; Anita and Belle Plaine, Iowa; Union Grove, Wisconsin; Osawatomie, Kansas; Sedro-Woolley, Washington; Kearney, Nebraska; Madison, Indiana.

Dean harmonic converters have been added to previous installations at Norfolk, Virginia; Hastings, Minnesota; Byesville, Ohio; Mandan, North Dakota; Troy and Lansingburg, New York, and miscellaneous orders for subscriber's station equipment, etc., have been received from Levis, Quebec, Canada; Kingsville, Texas; Grand Rapids, Michigan; Everett, Washington, and Wakefield, England.

H. H. FRANKLIN MANUFACTURING COMPANY, Syracuse, N. Y., has issued a new catalogue in which are described the Franklin "die cast parts." The book refers to the special features of the Franklin metal or alloy from which may be made castings so smooth as to require no subsequent machine finishing. For a considerable variety of small parts of telephones and telephone apparatus the company states that its castings have been used with marked success. As these small parts can be made with holes, slots, lugs and spurs all cast at a single operation, the saving in cost is likely to be considerable over that of similar parts which have to be cast rough and machined afterwards.

DURANT ELECTRIC SUPPLIES COMPANY, 52 Fifth avenue, Chicago, Ill., is calling attention to one of the advantages obtained by the use of ironite duplex drop wire in residential districts. It is well known that after a time copper wire stretches and the sag is frequently enough to make the appearance of the wires far less sightly than they were when first installed. Ironite wire has sufficient tensile strength to prevent it from stretching and once the loop is in place it "stays put." There is no sagging into trees and no unsightly, swaying loop, hanging so loosely as to offend the eye of the subscriber.

H. B. CHRISTENSEN CO., Inc., 33 Murray street, New York, claims to be able to save telephone companies considerable time and money on their blue printing work. This company has a special system for handling orders by mail, so that there is hardly any time lost. Companies wishing to make prints of circuits and layouts or even individuals who wish to keep a set of blue prints for constant reference and preserve tracings carefully can obtain prices, etc., by writing to the company.

NATIONAL TELEPHONE SUPPLY COMPANY, 3923 Superior avenue, Cleveland, O., reports a strong and increasing demand for its "non-breakable" messenger hangers. This type of hanger is especially designed for durability and the company will be pleased to send statements which show its value in actual service to all interested persons.

THE VOTE-BERGER COMPANY, La Crosse, Wis., has some interesting printed matter showing the value of the D. & T. anchor. It calls attention to the fact that this anchor can be installed without the aid of special tools in most locations in a very brief time. It will be pleased to send full information concerning the various standard sizes of anchors and their holding powers.

THE LEEDS & NORTHRUP COMPANY, 4901 Stenton avenue, Philadelphia, Pa., is prepared to give out information concerning the particular type of testing set best adapted to any one of the various conditions which arise in telephone practice. This company makes apparatus in which the utmost attention is given to the details which insure accuracy and durability, and the use of its instruments means the saving of a considerable sum each year on the maintenance account.

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A TOLL TICKET

BEARING THE RECORD OF TIME OF DURATION OF THE TOLL MESSAGE, COMPUTED BY

THE CALCULAGRAPH

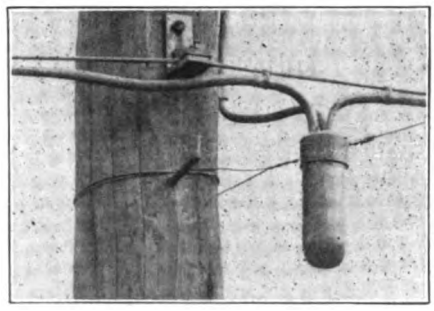
assures payment of the charge. Subscribers often forget a toll conversation by the time they receive your monthly bill. In case of dispute the Calculagraph Record is indisputable evidence.

It Makes No Clerical Errors
Write for Further Facts and Reasons Why

CALCULAGRAPH COMPANY

1437 JEWELERS BLDG., NEW YORK CITY

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.



A COMPLETED

Hargis Cable Splicing Joint

(Moisture-Proof)

differs only in appearance, the principle remains the same as the old style wiped joint. Its position in regard to the cable and messenger wire is practical. First, because the joint is on top, and therefore easier to inspect; and second, because when the splice is opened the conductors hang downwardly and are in a more accessible position. The pouring of the solder is very simple. There is no wiping necessary. In the old style Horizontal Wiped Joint both ends must be soldered and carefully wiped. This requires a knowledge and skill which many otherwise good cable men do not possess.

The position of the conductors is more practical for boiling out (simply immerse the exposed conductors in a pot of hot paraffin); it is more practical because of the greater ease in tagging the wires for conductor assignments and also for splicing.

The splicing of the individual pairs is identical with the old method, except that the paper sleeves are put on after the wires are spliced.

You will see from the above that any cable man is very well acquainted with the principles of this device. The difficult and objectional features of the Horizontal Joint are eliminated. Everything else remains the same, except the position of the Joint.

If you are considering new cable construction or changes in your cable plant, you should write us at once for information, prices, etc., on the Hargis Joint. They will save you time and money. You will improve your cable construction.

W. N. Matthews & Brother

Manufacturers of Patented Money Saving Specialties,

214 N. SECOND STREET ST. LOUIS

Branches: New York, San Francisco.

"Arrester"

"Leave not that to chance, which foresight might provide for or care prevent."

HE-IS-A-TOUGH CUSTOMER

But we have him safe!

WE will furnish the "Arrester,"
YOU furnish the "Good Ground."

REMEMBER! without "Good Ground" "Arrester" has no place to take him.

SUMTER TEL. MFG. CO., SUMTER, S. C.

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Live News Notes

NEW COMPANIES.

ELKMONT, ALA.—An Independent telephone company is being formed by the citizens of this city. An exchange is to be installed, and connections established with Athens, Elkmont, Pettusville and Estaville.

PILOT GROVE, MO.—At a meeting of the stockholders of what was known formerly as the Lazy Bend Telephone Company it was decided to incorporate under the name of the Pilot Grove Independent Telephone Company. Application is to be made to the secretary of the State for a certificate of incorporation, and work on the system commenced at once. The capital is given at $4,000, and the following officers and directors have been elected: J. V. Merceroe, president; Isaac Smith, secretary; Henry Brownfield, treasurer; John T. Davis, Grant Clark, Jacob Schneck, directors. Managers, Peter Dick, E. H. Harris, Jr., Grant Clark.

MONTOUR FALLS, N. Y.—Among the recently organized Independent telephone companies is the Montour Falls Home Telephone Company. The construction work on the company's plant, which is to begin at once, is to be in charge of H. R. Martin.

OXFORD, N. Y.—The Preston & Norwich Telephone Company, of Oxford, has filed articles of incorporation. The capital stock is given at $200, and the directors of the company are: Leander S. Law, Charles W. Powers, Burt E. Slater, Preston, N. Y.

MOTT, N. D.—Articles of incorporation have been filed by the Cannon Ball Telephone Company of this city. It has an authorized capital stock of $5,000, and the incorporators are G. H. Stone, Ray W. Conklin, F. I. Bonesho, of Mott, and others.

CINCINNATI, O.—An Independent telephone company, which is to be known as the Southern Ohio and Tri-State Independent Telephone Company, has been incorporated to operate in competition with the Bell Company. Its headquarters is to be in Cincinnati, and it expects to construct and maintain plants and exchanges in Hamilton, Clermont, Warren and Butler counties. The company has an authorized capital stock of $50,000, divided equally into common five per cent. preferred stock. J. P. Bliss, former member of the Columbus Board of Public Service, is interested in the new project, and with him are associated D. C. Collins, Jr., George Kolker, Thomas V. Sullivan, A. J. Koch and John Eggers.

NORWOOD, O.—Articles of incorporation have been filed by the Norwood Telephone Company, and the following are among the incorporators: G. Tilden Davis, Ashley E. Lowry, Harry L. Koreman, Philip P. White and Peter E. Brooks. It is the company's intention to construct and operate telephone lines between Norwood and other cities and villages in Hamilton, Butler, Clermont, Warren and Montgomery counties. The capital stock is placed at $15,000.

OKLAHOMA CITY, OKLA.—Having become dissatisfied with the service rendered in this city, the citizens are planning for the organization of a new company, and expect to apply to the city council at an early date for a franchise.

RICEVILLE, PA.—The People's Mutual Telephone Company has been incorporated with a capital stock of $10,000. Among the incorporators are Jessie Martin, Riceville; T. L. Dobbins, Lincolnville; A. Burrows, Tillotson; Albert Beakeslee, Matthew Merchant, Riceville.

TUNKHANNOCK, PA.—The Merchants' Telephone & Telegraph Company, of Tunkhannock, has been organized, and has commenced the construction of a line between that city and Chinchilla. Additional lines are to be built to a number of other towns.

DEL RIO, TEX.—The Del Rio & Western Telephone Company has recently been incorporated with a capital stock of $20,000, by L. Rust, J. H. Wiggins, of Del Rio, and others.

VENUS, TEXAS.—The Venus Telephone Company has been organized and the following officers elected: A. D. Frost, president; A. J. Florey, vice-president; John W. Bassett, secretary, and C. L. Parker, treasurer. Application for a charter has been made, and construction work on a telephone plant will probably be commenced at once. The launching of this new enterprise is said to be due to the attempts of the Southwestern Telephone & Telegraph (Bell) Company to raise rates.

DEWITT, VA.—The plans of the citizens of Dinwiddie for the formation of an Independent telephone company have been perfected, and a permanent organization effected. The company is to be known as the Dinwiddie County Telephone Company, and the following officers have been named: President, W. W. Sterne; vice-president, Dr. B. C. Jones; secretary, A. J. Sutherland; treasurer, J. E. Young; general manager, David Barner. The capital stock is $6,000 minimum and $15,000 maximum, and a sufficient amount has already been subscribed to begin operations. The principal place of business is to be located at Dewitt, and lines are to be extended throughout Dinwiddie county.

CHESAW, WASH.—An Independent telephone company, to be known as the Farmers' Independent Rural Telephone Company, has been formed by the ranchers southwest of Chesaw, and lines are already under course of construction out of the city. The organization of this company has been due to the poor service rendered by the Pacific States (Bell) Telephone Company, and a similar action is being considered by other citizens throughout Okanogan county.

NEW LONDON, WIS.—A Farmers' Telephone Company is being organized by the farmers living south and west of this city.

ONTARIO, WIS.—The Brush Creek Farmers' Telephone Company, Ontario, Vernon County, has been incorporated with a capital stock of $3,000. Among the incorporators are I. O. Hoff, P. A. Penderson and L. Olson.

WESTBY, WIS.—Articles of incorporation have been filed by the Dell Co-operative Telephone Company, of Dell, Vernon county (P. O. address Westby). It has a capital stock of $2,500, and the incorporators are Edward Clark, Henry Markee, Enos Daines and P. D. Miller.

FRANCHISES.

GRAND JUNCTION, COL.—A petition for a franchise for an Independent telephone company has been filed with the city council by J. M. Rich, who represents a number of Salt Lake capitalists. The charter sought by Mr. Rich and his associates is for fifty years, and includes the erection and maintenance of an Independent exchange in the city. The new company also agrees to allow the city to connect its lighting wires, fire and police alarms to the telephone poles free of charge, and also to furnish the city two free telephones. It is the intention of the applicants for this franchise to file similar petitions with the city councils of all large cities between Salt Lake and Denver, and establish systems to operate in competition with the Bell company.

MIDDLESBORO, KY.—A telephone franchise has been prepared by the city council of this city, and is to be offered for sale to the highest bidder.

ROCHESTER, MINN.—Application for permission to operate a system in this city has been made by the Tri-State Telephone & Telegraph Company, of Minneapolis.

GEORGETOWN, TEXAS.—Permission has been granted to the M. N. Halley Telephone Company to erect and maintain telephone lines along the Georgetown and Round Rock Road, and the Mason and Tisdale Road.

CENTRALIA, WASH.—The Northwestern Long Distance Telephone Company has applied for a franchise to install a local exchange in this city, and the first reading has been passed in the Council. A central energy plant is to be installed, and the company promises to install a fire alarm system with no expense to the city. The local exchange is to be in the hands of a local board of directors.

BRIDGEPORT, W. VA.—Application for additional rights of way in this city has been made by the Flushing Telephone Company.

FINANCIAL.

DAHLGREN, ILL.—The capital stock of the Dahlgren People's Telephone Company has been increased from $10,000 to $12,500.

MINNEAPOLIS, MINN.—The directors of the Tri-State Telephone Company have declared its seventeenth quarterly dividend at the rate of six per cent. per annum, payable Sept. 1st, 1907, to stockholders of record of August 20th, 1907. The company under its guarantee will also pay the twenty-second quarterly dividend of the Twin City Telephone Company at the stipulated rate.

BEATRICE, NEB.—The Home Telephone Company of this city has filed its annual report with the state railway commission, showing that it has $187,500 of capital stock subscribed.

KEYSVILLE, VA.—At the annual meeting of the Central Telephone Company, Eureka Mills, Va. (P. O. address Keysville), a six per cent. dividend was declared.

ELECTIONS.

OZARK, ARK.—The Home Telephone Company at its recent annual meeting elected the following officers and directors: President, M. B. Conatser; secretary, George O. Beuckman; treasurer, W. L. Wagner; directors, the officers of the company and L. L. Ford, of Webb City, and L. T. Morgan, of Altus. Herman Eiche has been made manager of the company.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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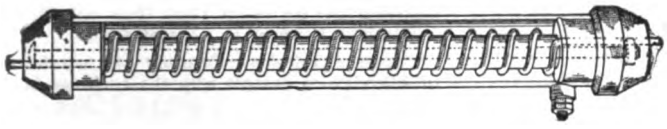
SKY ROCKET ARRESTERS PROTECT



In the Sky Rocket Arrester a 50-inch length of wire is built up into a succession of coils around a porcelain tube thus having a choking or reactance effect, and is surrounded by an iron cylinder to which is attached the ground wire.

When current of excessive potential, such as lightning, strikes the line wire it will not travel over this succession of coils into the telephone or switchboard. Instead it chooses the shorter path to ground, which is obtained by leaping the minute air gap between the discharge points of the wire helix and the grounded iron cylinder.

And Again—An Engineer Worthy of the Name Says:

"Thoroughly efficient protection is not much more expensive than partial protection, and is cheaper than carrying duplicate switchboard and instrument parts, in addition to the repair bill and almost inevitable interruption of service when apparatus is destroyed.

"Line Arresters SHOULD BE USED on the line at high altitudes, exposed lengths, fractional multiples of the line length to catch standing waves, and in the usual path of thunder storms."

SKY ROCKET ARRESTERS

are the most scientifically constructed line arresters manufactured, and

THEY ALWAYS PROTECT

Write To-day for Sample

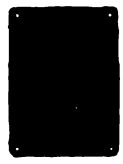
Chance Manufacturing Co.

Centralia **Missouri**

N. B.—The names of engineers quoted in this series of advertisements will be given on application.

Easophones — The Wire & Telephone Company of America — Rome, N.Y.

SINGLE COIL RINGER ALWAYS IN ADJUSTMENT



Bell Box, Rear View

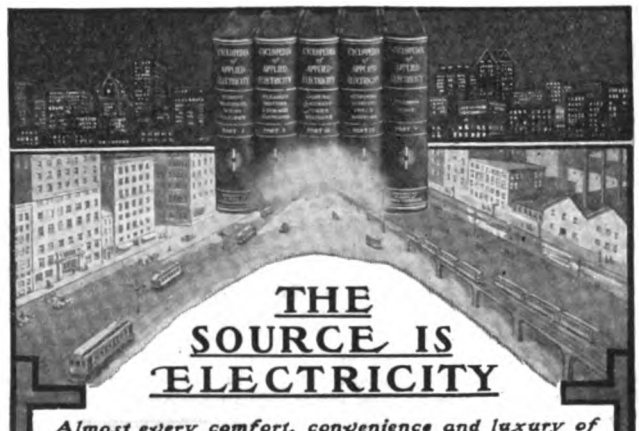
The Easophone Bell Box is formed of one piece of heavy rolled sheet steel. The box is treated with repeated coatings of baked enamel, which gives it a highly polished finish. This contains the ringer movement, bell, induction coil, connection strips and condenser. The Potter single coil ringer movement is not only compact, but highly efficient. It is of substantial construction, and when assembled the coils are surrounded by the heavy horseshoe magnet, and thus protected on all sides from blows from which might result mechanical injury. The ringer movement is self-contained, and can be assembled and tested before being mounted in the box and fixed in permanent position, which is done by two screws, no solder or other means of connection being necessary. The movement consists principally of a wire helix, a permanent horseshoe magnet and a vibrating armature freely operating between the helix and through the powerful magnetic field between the pole faces. No adjustment to the armature is necessary. The induction coil in the bell box is held rigidly in position by springs, and when unsoldered from the wire form is readily removed.

See our ads. of August 3rd, 10th, 17th, 24th, 31st and September 14th.

The Wire & Telephone Company of America

ROME, N. Y.

Manufacturers of Telephone Wire and Supplies



THE SOURCE IS ELECTRICITY

Almost every comfort, convenience and luxury of modern life is dependent upon it.

Under these circumstances, do you think you can make any mistake by devoting a few hours a day to the study of electricity?

CYCLOPEDIA of APPLIED ELECTRICITY

Fine handsome volumes containing the essence of the most successful methods yet devised for the education of the busy workman. The rules and formulas are in every case presented in a very simple manner, and every principle is illustrated with special diagrams and practical examples. Compiled from the most valuable instruction papers of the American School of Correspondence.

We employ no agents. Our books offer the best plan to demonstrate the superiority of our methods of instruction, and in order to prove this to the public we offer the Cyclopedia at a great discount for a short time only.

ORDER NOW—SAVE $10.20

Special Price, $19.80 **Regular Price, $30.00**

Sent express prepaid if you mention American Telephone Journal, September 7, 1907. Pay $2.00 within one week and $2.00 a month until the Special $19.80 Price is paid. If not adapted to your needs we will send for the books at our expense upon notification.

2,500 pages. 2,000 full page plates. Bound in three-quarter morocco. Handsomely marbled tops. Gold stamped titles and edges. Size of books 7x10 inches.

American School of Correspondence

CHICAGO

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Live News Notes

BEATRICE, NEB.—The officers of the Home Telephone Company are J. F. Hemenway, president; R. V. Montague, vice-president; W. H. Caman, secretary and treasurer.

ST. JOHNSBURY, VT.—At a special meeting of the stockholders of the Citizens' Telephone Company, Elisha B. Seeley, of Boston, was elected president and manager, and Mrs. Lena Owen secretary and treasurer.

KEYSVILLE, VA.—The following officers and directors have been elected by the Central Telephone Company, of Eureka Mills (P. O. address Keysville): President, Capt. A. J. Terry; secretary-treasurer, W. G. Williams; general manager, W. G. Williams; directors, J. C. Carrington, F. C. Thornton, S. A. Lawson and Lee W. Morton. Executive Committee, J. C. Carrington, T. C. Thornton, and Capt. N. L. Shaw.

COMBINATIONS.

RED BLUFF, CAL.—The system of the Swanson Telephone Company has been purchased by the Sunset Telephone Company. The system will be reconstructed at once.

WATSEKA, ILL.—The two telephone exchanges at Watseka have merged into one under the name of the Watseka Telephone Company.

BETHEL, ME.—At a recent meeting of the stockholders of the Bethel Local Telephone & Telegraph Company it was decided to merge with the Maine Telephone Company.

MISCELLANEOUS.

COLORADO CITY, COL.—By order of this city telephones have been installed in the Longfellow, Bancroft, Midland and Whittier schools by the Home Telephone Company.

KILBOURNE, ILL.—During a recent fire at this city the Citizens' Telephone exchange was completely destroyed, as were the toll lines running into it. It is estimated that the loss on the telephone exchange alone will amount to over $2,000.

PRINCETON, ILL.—The Bureau County Independent Telephone Company has been reorganized and the following officers named: Aaron Dunbar, of Dover township, president and general manager; Elmer Sapp, Wyanet, vice-president; O. A. Cole, asst. general manager. Many improvements in its plant are contemplated.

QUINCY, ILL.—Many telephone wires were put out of commission by a recent storm at this city.

STREATOR, ILL.—Considerable damage was done to the lines of the Independent Telephone Company during a storm at Streator.

NEW ULM, MINN.—Considerable damage to its rural lines was sustained by the New Ulm Rural Telephone Company in a recent storm.

OWATONNA, MINN.—The Farmers' Telephone Company has accepted a proposition from the city of Ellendale to connect with the exchange in that place at the rate of two dollars per subscriber per year. This removes the last obstacle in the way of the success of this company.

BRINSMADE, N. D.—The name of the Brinsmade-Normania Telephone line has been changed to the Normania Farmers' Telephone Company. Work on the installation of its system has been commenced.

WINNIPEG, MAN., CAN.—The Manitoba government is negotiating with the Bell Telephone Company for the purchase of the company's systems in Winnipeg, Brandon and several other large towns in the province. Publicly owned lines for the province were decided upon by referendum in January, and the government called for bids for poles for 1,000 miles of line. It is thought that the Bell company, in the face of competition, now desires to sell out.

Extensions and Improvements

BATES, ARK.—An exchange at Bates has been installed by the Waldron Telephone Company, which gives free service from there to Waldron, Heabener, Wicks, Morgan and all intermediate points.

HOMESDALE, IDAHO.—Among the improvements planned by the Independent Telephone Company is the construction of a line from Caldwell to Homesdale.

BLOOMINGTON, ILL.—The National Telephone & Electric Company, which has just erected a number of lines in the western part of the county, has commenced the construction of its lines in this city.

CAIRO, ILL.—It is the intention of the Home Telephone Company to expend about $50,000 this fall in the rebuilding of its exchange and lines.

MACKINAW, ILL.—Many improvements in its system at Mackinaw are being made by the Minier Telephone Company.

HAWARDEN, IA.—Arrangements are being made by the New State Telephone Company for the erection of a new toll line from Hawarden through Ireton, Mautice, Orange City, and Alton, to Granville.

AUDUBON, MINN.—Many improvements and extensions in its system are being made by the Audubon Telephone Company.

ENOK, MINN.—Many new lines are being built by the Rural Telephone Company.

WEST PLAINS, MO.—Citizens of this city and Willow Springs have recently organized a new telephone company to construct and operate telephone lines in the towns of West Plains, Willow Springs, Cabool, Mountain Grove, Norwood, Mansfield, Seymour and Fordand, and will connect with the Independent Telephone Company's lines in Springfield.

FLORENCE, NEB.—The Independent Telephone Company is considering the advisability of erecting a new exchange building in Florence, providing a sufficient number of subscribers can be secured, to be operated in conjunction with the Omaha, South Omaha and Council Bluff exchanges.

ALTON BAY, N. H.—A new line from Alton Bay to Exeter is planned by the Independent Telephone Company.

MEDINA, N. D.—Among the new Independent lines being constructed is one from Medina to Marstonmoor, which is being erected by W. J. Dwyer.

POMEROY, O.—Many extensions in its system are being made by the Pomeroy & Middletown Telephone Company, and its system otherwise improved.

YOUNGSTOWN, O.—The Youngstown Telephone Company is extending its system in Hubbard.

OREGON CITY, ORE.—The Home Telephone Company has recently received its new central office switchboard which will be installed immediately. New lines are being constructed to connect with The Mollalla and Beaver Creek Mutual Telephone Company, the Clear Creek Mutual Telephone Company, the Highland Telephone Company, the Canby Telphone Company, and others.

BANCROFT, S. D.—Farmers living between this city and Iroquois have recently organized a telephone company for the purpose of constructing a line between the two cities, upon which all of the subscribers along the route would be connected. The construction of this line is progressing quite rapidly. So many applications for service have been received since the start of the new line that several branch lines will also have to be built.

COGSWELL, S. D.—The Social Telephone Company of Briton is constructing a line to connect Briton with this city. When the line is completed an exchange system will be installed in Cogswell to care for the local subscribers to the service.

PORT TOWNSEND, WASH.—The service given by the Independent Telephone Company in this city has proved so satisfactory that telephones are being installed in the U. S. Customs building, and a line connecting the dock office of the Customs with the main line is also to be built.

WHEELING, W. VA.—The National Telephone Company, which will soon have a through line to Parkersburg, is also building a direct line to Oil City. It is also stated that a line will be extended south from Parkersburg to connect Huntington.

CAMPBELLSPORT, WIS.—New lines are being erected in this city by the Theresa Union Telephone Company.

LADYSMITH, WIS.—The present system of the Chippewa Valley Telephone Company, at this city, is to be replaced by a metallic circuit system, and its plant otherwise improved.

SPARTA, WIS.—The Sparta Telephone Company has recently completed the construction of a new pole and trunk line from this city to Cashton which will materially improve the service between the two places. Numerous other improvements and new lines are contemplated in the near future.

WRIGHTSTOWN, WIS.—The Manitowoc and Western Telephone Company is erecting poles for its new system in Wrightstown and will give free exchange with De Pere, Green Bay, Morrison, Greenleaf and a number of other surrounding towns upon its completion.

BRANTFORD, ONT., CAN.—A large amount of work has been done on outside aerial and cable construction work for the new telephone system which is being installed in this city. It is the company's intention to have the system completed this year.

UNDERGROUND.

WILMINGTON, DEL.—The telephone companies in this city have laid a large amount of conduit in the business portions and there is now a movement on foot by the city to lay a conduit system for the balance of the conductors that now disfigure the city. If this movement is carried out, all electric light, power and telegraph wires will be taken down and installed in the conduit system.

GLOVERSVILLE, N. Y.—Permission to place some of its wires underground in this city has been granted to the Glen Telephone Company.

FARGO, N. D.—The conduit system of the Northwestern Telephone Exchange Company is being installed.

FARGO, N. D.—Construction work on conduits for its underground telephone lines is being carried on by the North Dakota Independent Telephone Company.

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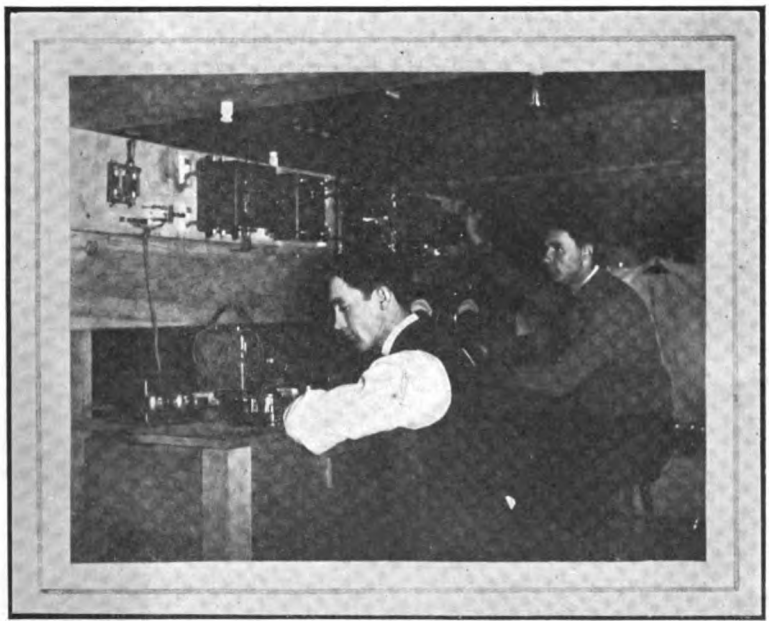
VOLUME XVI. SATURDAY, SEPTEMBER 14, 1907. NUMBER 11.

Practical Telephone Studies at the University of Minnesota

By Geo. D. Shepardson.

TELEPHONE courses of both a practical and theoretical character are open to students in the electrical engineering section at the University of Minnesota. During the final year, when these courses are offered, students are given an opportunity to specialize to a limited extent, the preparatory subjects having been studied during the preceding three years.

For admission to the university a preparation equivalent to that obtainable in the best high schools is required. Upon his admission to the university the student in electrical engineering takes up a broad variety of studies common to all engineering courses, and designed to provide a foundation for the subsequent more specialized training. His work is designed to give him a useful familiarity with English literature and composition and provide a practical training in engineering, drawing, mathematics, physics, chemistry, shopwork, strength of materials and design. In common with the mechanical engineering course, the theory and testing of water, steam and gas engines are studied in classroom and laboratory throughout the third and fourth years.



Students at the University of Minnesota Making Tests of Pole Changers.

The study of electricity begins in the second year, as soon as the student has secured the necessary training in mathematics, mechanics and heat. During the third year, the general phenomena and laws of electricity and magnetism are studied in classroom and laboratory from both the scientific and engineering standpoints, special attention being directed to the principles and practice of wiring, electrical testing and measurements, design, construction and operation of electric generators and motors. During the senior year attention is directed largely to the theoretical and experimental study of alternating currents, and to electrical engineering practice in its various branches, such as signalling, lighting, railways, central stations, storage batteries, transmission of electrical energy, and telephony.

The instruction in telephony in the senior year includes a course of thirty-six lectures, which may be accompanied by laboratory work at the option of the student. The lectures set before the students an outline of the various methods of communication; a brief discussion of non-electric methods of long distance communication; phenomena and laws of light, sound and electromagnetism applicable to electric signalling; electromagnetic movements and their application to bells, indicators, semaphores, sounders and relays, polarized bells and relays, telephone receivers and pole-changers; signal circuits for bell, watchman and burglar alarm systems; fire alarm and district messenger systems; simple, duplex, quadruplex, printing and synchronous telegraph systems; railway block signal systems; various physical phenomena utilizable for electric telephone receivers or transmitters; theory of magneto transmitter and receiver; microphone and induction coil; functions of the exchange and of the subscriber's set; intercommunicating systems; methods of calling and communicating with the operator and subscriber; multiple boards; A and B boards; toll boards; measured service; busy test; supervisory signals; testing; distributing and protective racks; central energy systems; exchange power plant; service officials, traffic problems; location of exchange and branches; aerial and underground lines; line disturbances from leakage, static and magnetic induction; effects of wave-form of calling current; wave transmission; loading systems; general principles of space telegraphy; and also simultaneous telegraphy and telephony.

Throughout the lectures, emphasis is placed upon the underlying principles rather than upon the innumerable details in application, many of which, however, are shown as illustrations. The lectures are supplemented by inspection visits to the exchanges and offices of the Minneapolis Fire Department, American District Telegraph, Western Union Telegraph, North American Telegraph, Northwestern Telephone Exchange (Bell) and Tri-State Telephone (Independent) companies. The university is enabled to offer its students an exceptional opportunity to get

Editor's Note.—Mr. Shepardson is the Director of the Department of Electrical Engineering, University of Minnesota.

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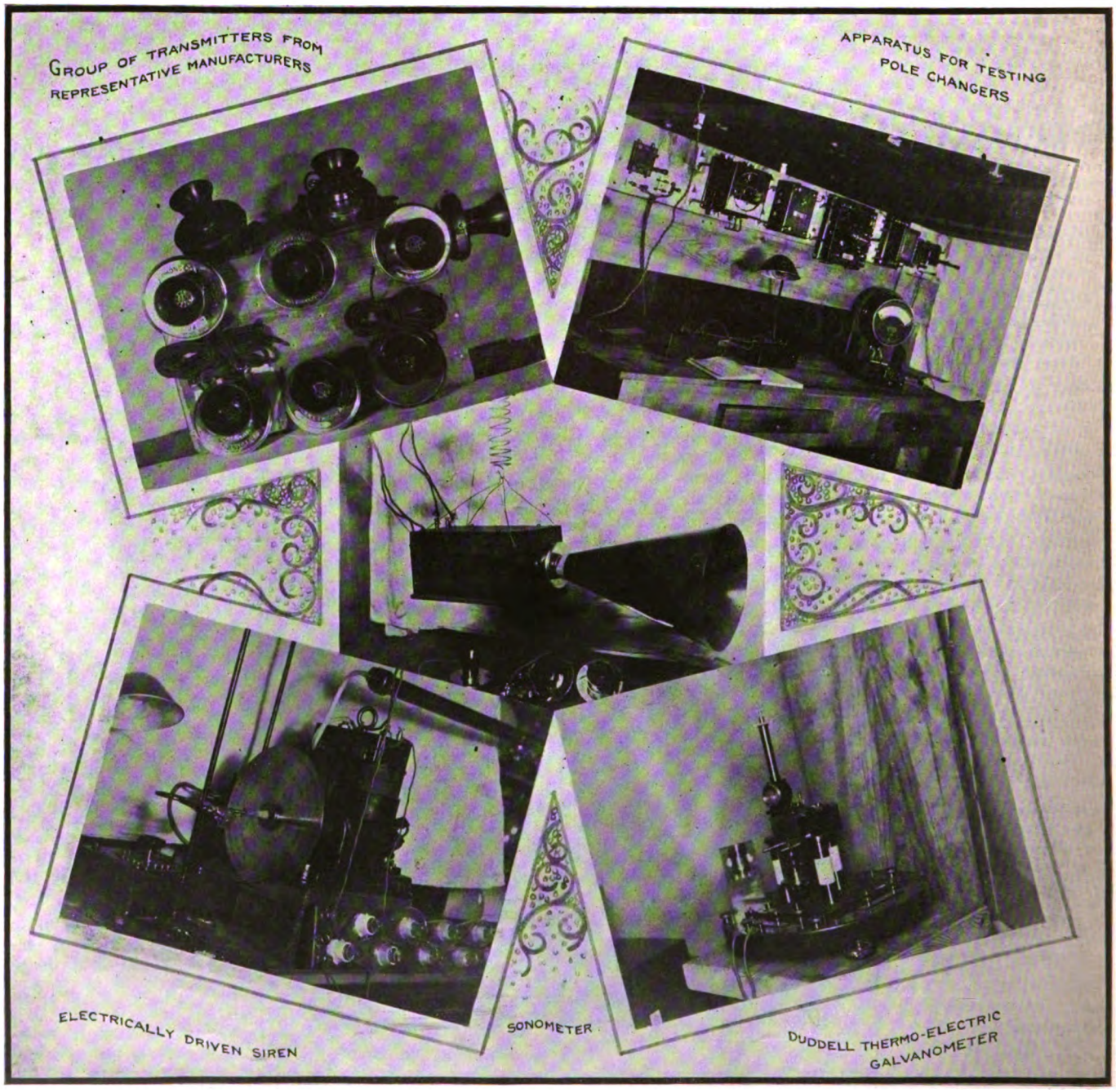
in touch with practical features of telephone work, and in a rather broad field, owing to its location at Minneapolis, the headquarters of large Independent and Bell operating companies.

The laboratory is equipped with primary and secondary batteries, dynamos and motors for direct and alternating currents, voltmeters, ammeters, wattmeters, testing sets, bridges, standards of resistance, self-induction and capacity, rheostats, condensers, ringing generators, pole-changers, ringers, bells, annunciators, telegraph sounders and relays, telephone receivers, transmitters, induction coils for various purposes, series and bridged subscribers' sets, complete subscriber and exchange equipment for both magneto and common battery exchanges with single party line and four-party selective ringing lines. For special investigations, there are oscillographs of the Duddell and General Electric manufacture, with two and three moving elements suitable for photographing wave-forms to 7,500 periods per second; Duddell thermogalvanometer with several heaters suitable for measuring currents as small as one ten-millionth of an ampere; and a variety of electrodynamometers and recording apparatus. The studies carried on in the laboratory are designed to give the men engaged in them not only a broader and more definite knowledge of methods of testing and investigating apparatus, but to arouse their interest in some of the fascinating problems which they will later on encounter in the field of practical work.

The gratifying success attained in this direction can perhaps be indicated in the best manner by a reference to some of the series of experiments which have actually been conducted in past years by students in the telephone course. At the same time, these references will serve the further purpose of indicating the direct bearing of the university laboratory studies as a means of fitting a man for engaging directly upon work in telephone engineering after his graduation.



Typical Groups of Equipment for Carrying on Telephone Studies in the Electrical Engineering Laboratories.

One of the photographs reproduced in connection with this article shows a device constructed by H. G. Morton and L. C. Tomlinson for the purpose of securing a sound of uniform pitch and strength for comparative tests of telephone transmitters. A flageolet giving 476 vibrations per second was blown at uniform pressure by air from a 5-gallon can filled by a foot-bellows and regulated by a relief valve consisting of a tube inserted into a

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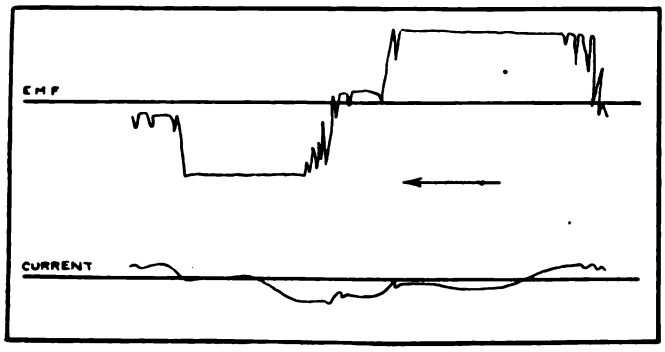
bottle partly filled with water. Using some care in operating the bellows, a satisfactory pressure was secured. As a sample of the results obtained, it was found that transmitters of various types operated on local battery of 2 volts developed in the secondary of

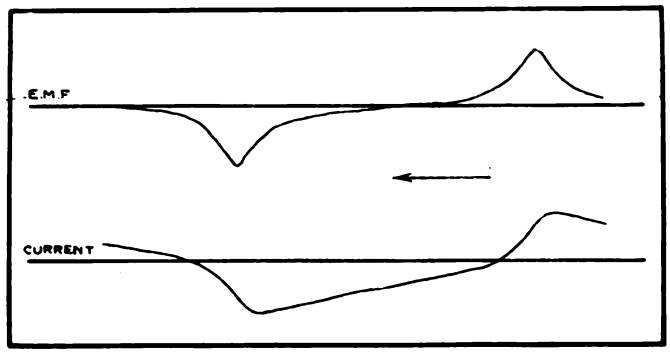


Wave Forms of E. M. F. and Current from a Pole Changer Ringing Two Bells (Poorly Adjusted).

a repeating coil pressure which sent through a 3000-ohm circuit currents varying from 0.000055 ampere for a poor transmitter to .000,65 ampere for a good one.

In experiments looking toward the measurement of the intensity of sound, it was found that telephone transmitters gave varying results according to the character of the sound. To investigate the sensitiveness of a transmitter to sounds of varying pitch, a siren was constructed by L. W. Eddy and E. B. Thornton to produce sounds of any desired pitch and of uniform intensity. A brass disc was mounted on the shaft of an adjustable speed motor, the disc having four sets of holes evenly spaced. Sounds of any desired pitch were obtained by causing a jet of air to blow against any selected circle of holes, constant air pressure being obtained from a reservoir supplied by a motor-driven air pump. Near the siren and supported by a spring and dampened guy-wires was arranged a "sonometer" consisting of a transmitter with a removable megaphone, mounted on a box which contained a transmitter induction coil. When a suitable battery current was sent through the transmitter, and the jet of air was sent against the rotating perforated disc, sounds of any desired pitch affected the transmitter and caused induced currents in the secondary circuit which were measured by a special thermo-electric galvanometer. Thus a certain transmitter was found to be most sensitive for sounds of 484, 932 and 1,865 vibrations per second and to be least sensitive for sounds of 400, 800 and 1,600 vibrations. The latter figures are for sounds exactly an octave apart; probably more careful tests would show the most sensitive values to be also separated by exact octaves.

By means of an oscillograph, H. D. Alton and J. E. Smithson obtained some interesting curves showing the wave forms of EMF and of current from pole changers and also from magneto generators of a number of different types. Sample curves reproduced show the performance of a magneto and of two different types of polechanger when operating two ringers in the usual way. It will be noted that the current curves are smoother than the EMF curves, and that the peak of the current wave lags behind that of the EMF wave, as theory indicates should occur.

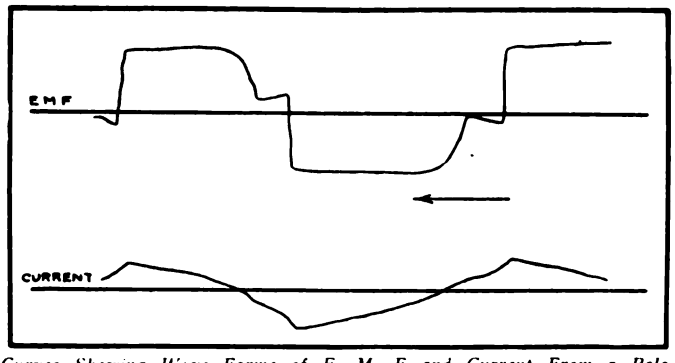


Wave Forms of E. M. F. and Current From a Magneto Generator Ringing Two Bells.

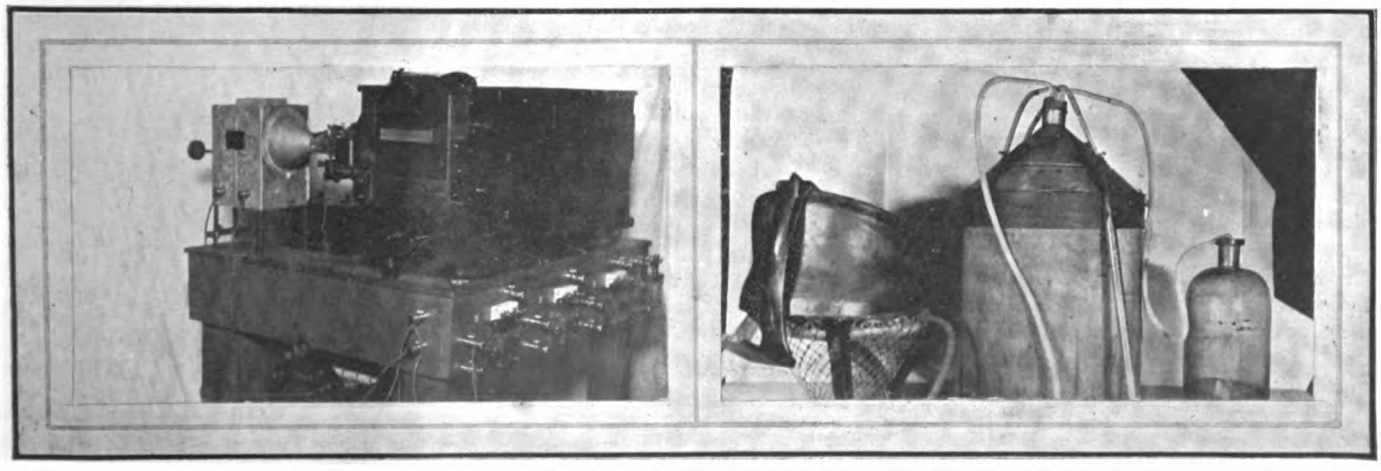
The electrical engineering department library includes over 900 bound volumes of periodicals and over 300 books on electrical engineering and closely allied topics. Technical libraries of about the same size are accessible in the departments of mathematics, physics, chemistry, civil engineering and mechanical engineering. These are supplemented by the general University Library, the Public Libraries of Minneapolis and St. Paul and the State Library.

Supplementing the undergraduate work offered in telephony as above outlined, the department of engineering mathematics offers advanced students various courses in mathematical physics, such as the theory of elasticity and sound, theory of electricity and magnetism including electromagnetic wave transmission, attenuation and distortion, and a discussion of the researches of Heaviside, Pupin and others.

Upon the completion of the new Engineering Building, for which the legislature has made ample appropriation, the University expects to develop the telephone engineering course more fully.



Curves Showing Wave Forms of E. M. F. and Current From a Pole Changer Ringing Two Bells.



Oscillograph and Mechanically Operated Flageolet Used in Investigations at the University of Minnesota.

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Canada's Second Independent Telephone Convention

By W. R. Rutherford.

A DETERMINATION to carry on vigorously their fight for the more perfect development of communication systems in all parts of the Dominion was strongly in evidence among the telephone men at the convention of the Canadian Independent Telephone Association, held at Toronto, on September 4th. Sixty-three delegates registered during the morning. Their enrollment, the appointment of committees, with the reports of the president and the secretary, occupied the members during the first session.

After president Alpheus Hoover, of Green River, Ont., had opened the meeting with a brief address, secretary A. F. Wilson, of Markham, Ontario, in his report called attention to the very satisfactory and substantial growth which has been made by Independent companies in several typical locations. Referring to the direct result of the Association's work he said:

Dr. J. F. Demers.

"During the past year, in addition to handling a vast amount of work by correspondence, the officers of the Association have traveled largely throughout Ontario, assisting local people in the formation of public opinion, and aiding in the formation of companies. The president and Dr. Demers assisted Mr. Dagger in the Manitoba campaign last winter, and contributed in large measure to the great popular victory over the "would be" telephone monopoly.

The general progress of the movement was very considerable, as shown by figures in Mr. Wilson's possession. More accurate figures are hoped for in the future, when members appreciate more fully the importance of co-operating with the Association by giving information promptly. A part of the secretary's report gives the following data:

"In Quebec the Bellechasse company obtained favorable legislation from the Government and also obtained a satisfactory franchise from the city of Quebec, the first city of over 50,000 population in Canada to try a live competitive system. The other Quebec companies report rapid progress.

"In Ontario progress has been most satisfactory and in considerable areas in the province the Independents have left the 'Bell' far behind. The greatest difficulty met with has been in towns and cities where the Councils have, against the wish of the citizens generally, granted a five year monopoly to the 'Bell.' We might remind the public that under the laws of Ontario permission is given to Municipal Councils to grant a monopoly to a telephone company. A monopoly cannot be given to any company other than the 'Bell,' and no municipality can give a monopoly in any other matter over which it has jurisdiction. In no other province of the Dominion can this monopoly be granted.

"So far the development has been greatest in the counties adjacent to Lakes Erie and Ontario, and in New Ontario, but the movement is spreading generally. Nearly every company's report shows rapid growth in subscribers, many doubling in the year. Most of the systems have been brought up to standard both in equipment and outside construction, so that there are only a few single wire systems remaining.

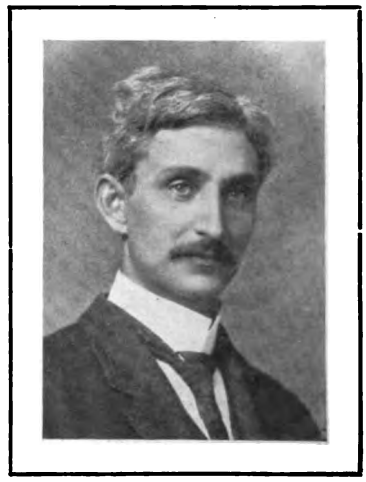
"From the West, where Manitoba and Alberta have decided on Government systems, Saskatchewan, where the matter is under investigation, reports are very satisfactory; local companies and municipalities are preparing to go ahead as quickly as conditions permit.

"The forms sent out by the Secretary not having been all returned yet, it is impossible to give complete figures, but judging from the reports just to hand, and the latest previous reports, we have every reason to believe that there are now from 18,000 to 20,000 non-Bell or Independent telephone subscribers in Canada, nearly all the result of less than three years, against about 90,000 of the Bell, the result of 25 years.

"To show the advantages to the public of the Independent telephone movement and of competition, we give several counties in Ontario. In Elgin County, outside of St. Thomas, where there still exists the exclusive franchise, there is a population of about 29,000. Of Bell telephones there are about 200, the Independents have over 650; Haldimand, population 19,200, Bell 133, Independents 400 installed and over 450 orders; parts of York and Ontario, population about 16,000, Bell about 160, Independents about 600; Halton, population 18,400, Bell 300, no competition. Peel, population 19,900, Bell 200, no competition. These figures speak for themselves."

During the afternoon session the committee on resolutions offered its report. The adoption of its recommendations, the more formal of which are given separately at the end of this article, shows that the Canadian association has been a close observer of the methods and principles which have brought success to its fellow organizations in the United States. It will take up questions of telephone development on broad lines, and strenuously resist any efforts of the Bell company to perpetuate its monopoly by subtracting the smaller companies, one by one, from the general organization in order that it may at its leisure destroy their identity.

The resolution endorsing Toronto's petition to the Ontario Government for a movement towards public control of telephones similar to that in Manitoba gave rise to considerable discussion as to the advisability of pressing for a plebiscite so soon as the next municipal elections. A suggestion offered by Messrs. A. F. Wilson and Dr. Doan was that a delegate should wait on the Government to urge some steps towards nationalization, but that the call for a plebiscite was premature, as the Association could not conveniently conduct the necessary educational campaign before the end of this year. Mr. F. D. Mackay thought that if the Government would call for a plebiscite it must fight for it itself. He stated that he expected Mr. R. L. Borden's announcement in his policy in favor of nationalization of telephones and telegraphs would force the Dominion Government to take some action along that line.



F. Page Wilson.

One of the interesting addresses delivered at the convention was by Geo. R. Bidwell, who spoke of the great need of Independent telephones in New York City.

Mr. Francis Dagger, whose efforts went far toward securing the favorable vote in Manitoba last year, and who is now investigating conditions for the Government of Saskatchewan, said that he finds popular feeling generally strong for public ownership of long distance telephone lines. He is not himself in favor of the Government owning local exchanges, but thinks each municipality should

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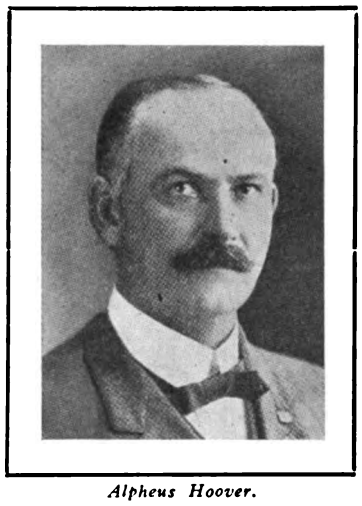
control its local exchange, whether it owns it or not being left to its choice.

Speaking of his work in Saskatchewan, Mr. Dagger reported that the Government of that province wants to develop the telephone system, so as to offer to every farmer a good service at a reasonable rate. The Government may have to build long distance lines.

As to Ontario calling for a plebiscite, Mr. Dagger pointed out the difference between conditions there and in Manitoba. In Manitoba the rate was practically on a money by-law, by which the municipality was given the perpetual right to borrow money for the purpose of buying a telephone system. In Ontario the Government would not take a plebiscite unless confident that it would carry.

One of the members, Mr. Bragg, who represented the Union of Canadian Municipalities, pointed out that its Bureau of Information at Ottawa stands ready to furnish freely to any municipality information as to the working of telephone systems in other places—a matter for which Mr. Dagger said he had come 1,800 miles to this convention, quite as much as for the purpose of the meeting itself. It was suggested that next year the Association should, in planning its convention, get in close touch with the Union of Canadian Municipalities, through which a great part of the good received by the municipalities has come.

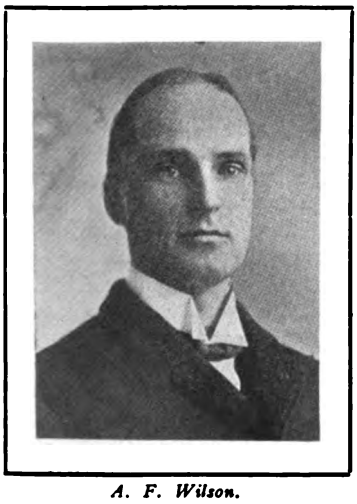
Previous to the adoption of the resolution condemning the practice of dealing with the Bell company, there was a very animated discussion of the question of admitting Bell lines to Independent exchanges for toll connections. The dangers of this practice were clearly pointed out by many of the members. Some of the members told of their own success as a result of maintaining an attitude of absolute independence. "In Jordan," said Levi Moyer, "the Bell had 69 subscribers, and we expected to put in 60 telephones. Now we have 120, and the Bell have just 12 left." The advantages of uncompromising competition were so unanimously agreed upon that the resolution to keep wholly clear of Bell entanglements was passed with more enthusiasm than any other presented.



Alpheus Hoover.

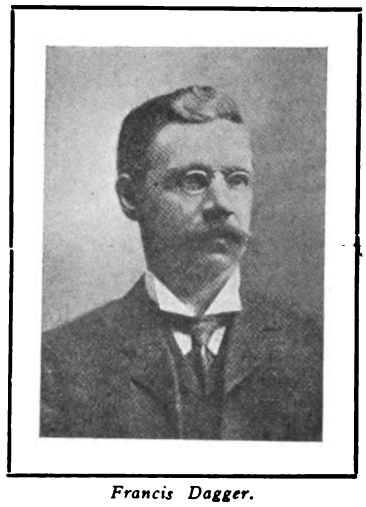
A motion by Mr. Wisner, carried, calling for the appointment of a committee on publicity, one on permanent organization, and one on arbitration, the latter to adjust differences between Independent companies.

The following officers were elected: President, Dr. J. F. Demers, Levis, Que.; vice-president, Dr. W. Doan, Harrietsville, Ont.; secretary-treasurer, F. Page Wilson, Toronto. Executive committee: Dr. E. Hart, Brantford; Dr. Anthony Ochs, Hespeler, Ont.; A. D. Bruce, Gormley, Ont.; C. Skinner, Sherbrooke, Que.; F. Dagger, Regina, Sask.; L. Moyer, Beamsville, Ont.; J. Dyke, Fort William, Ont.; T. R. Mayberry, Ingersoll, Ont.; G. W. Jones, Port Hope, Ont. Auditors: C. B. Adams, Harrietsville, Ont.; Dr. F. A. Dales, Stouffville, Ont.



A. F. Wilson.

Among the members present were: Alph. Hoover, Green River; Dr. W. Doan, Harrietsville; E. Hart, Brantford; C. Skinner, Sherbrooke; Anthony Ochs, Hespeler; F. D. Mackay, Toronto; C. B. Adams, Harrietsville Tel. Co.; James Ross, Waterford, Norfolk Co. Tel. Co., Ltd.; S. L. Squire, Waterford, Norfolk Co. Tel. Co., Ltd.; Eli Barber, Vanessa, Waterford, Norfolk Co. Tel. Co., Ltd.; A. W. Venning, Belmont Tel. Co. Association; Myron A. Gee, Erie Tel. Co., Selkirk, Ont.; Levi Moyer, Niagara District Tel. Co.; Camby Wisner, Jordan District Tel. Co.; F. Page Wilson, Toronto; T. R. Mayberry, Ingersoll Tel. Co.; A. C. Wisner, Canadian Independent Tel. Co.; Alex. D. Bruce, Gormley, Bethesda & Stouville Tel. Co.; F. A. Dales, Stouffville, Bethesda & Stouffville Tel. Co.; J. F. Demers, M. D., Man. National Tel. Co., Levis, Quebec; W. A. Fuller, Green River, Markham & Pickering Tel. Co.; F. Dagger, Saskatchewan Government, Regina; A. C. Beatty, M.D., Garden Hill; Alex. Neilson, Brown's Corners, Scarboro' Tel. Co., Ltd.; G. W. Jones, Port Hope Tel. Co., Ltd., Clark, Ont.; A F. Wilson, Markham; John A. Sprague, Sprague Tel. Co., Demorestville; Hy. Sneath, the Burgessville Tel. Co., Burgessville; J. G. Corless, the Burgessville Tel. Co., Burgessville; H. A. Fairman, Hastings Tel. Co.; William Wade, proprietor Wade Tel. Line Co.; J. A. Horsey, Scarboro' Tel. Co., Agincourt; James G. Sprague, Sprague Tel. Co., Demorestville; Ralph Horsey, Scarboro'; V. H. Calhoun, Halton Home Tel. Co., Milton.



Francis Dagger.

The convention adjourned until the second week of the Canadian National Exhibition next year. It will probably be held during two days, and in some place where an exhibit of telephone appliances can be made by manufacturers.

Resolutions Adopted at the Canadian Convention.

Whereas, The time is opportune for the Government of Ontario to take over the long distance lines, and,

Whereas, The Toronto City Council has already petitioned the Government to this end,

Be it resolved, That this Association heartily endorses the above action, and would urge upon the Government the holding of a plebiscite at our next municipal elections, in order to ascertain the voice of the people on this subject, and that a delegation be appointed to wait on the Government on this matter.

Whereas, The Bell Telephone Company is proposing long distance connection to local Independent telephone companies in various parts of Canada, and offering in consideration to abandon the local field in certain sections, and

Whereas, It is the opinion of this Convention that any such connection is bound to injure the Independent telephone cause as a whole, therefore

Be it resolved, That this Association frowns upon and denounces any such affiliation or connection of Independent telephone companies with the Bell company anywhere in Canada as being injurious to the people as a whole, and that this Association endorses the action of the International Telephone Association, held in Chicago on June 4th, 1907.

Beware of Contracts.

Whereas, The Bell company has attempted to coerce all companies to sign contracts precluding them from connecting with any other person or company and not to compete with the Bell, and whereas such clauses stifle competition and intrench the Bell in monopoly, besides being used to break up Independent interconnection.

Be it resolved, That the action taken by the officers in protesting to the Railway Board of Canada against the ratification of all such contracts and requesting the right to be heard, be approved, and the President authorized to take such action as he may deem advisable.

The following resolution, adopted at last year's convention, was reaffirmed:

Whereas, The granting of exclusive franchises is detrimental to the

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progress of cheaper and better telephony, by excluding towns and cities from the benefit of telephone competition and outside connection,

Be it resolved, That no municipality should have the power to grant exclusive franchises to any company, and that this Association petition the Legislature to rescind all legislation which makes such possible.

OFFICES BARRED TO MANUFACTURERS.

Resolved, That no member being either directly or indirectly connected with a telephone manufacturing or supply company or firm shall be eligible to hold office in this Association, nor shall the official headquarters of this Association be located upon the premises of any telephone manufacturer or supply house.

Resolved, That a permanent committee on finance be formed by the Executive from their number, with full powers incidental to such committee.

AFFILIATION ENDORSED.

Resolved, That the action of the Executive in affiliating with the International Independent Telephone Association be approved.

Resolved, That the emblem selected by the Executive Committee be approved, and all Independent companies be urged to use it in all printed matter, and that subscribers be urged to place on their letter heading "Independent Telephone."

Resolved, That the Executive Committee be instructed to consider the Ohio plan of constitution, and report upon it at the next convention.

The Pupin Mode of Working Trunk Telephone Lines*

BY SIR WILLIAM PREECE.

A COMPLETE telephone circuit with its Pupin coils is shown in Fig. 2. It is one of a pair of twin copper lines of No. 14 B. & S. gauge, weighing 65 pounds per mile, twisted about each other and insulated with dry paper, having a resistance of 13.7 ohms and a capacity of 0.065 microfarad per mile. Each coil has a pure soft iron ring core 3 inches in diameter, made of fine varnished wires to reduce hysteresis to the lowest possible point, and is wound with two wires which are connected as shown in Fig. 3. Mutual induction is thus eliminated and self-induction alone is active. It has an inductance of 0.252 henry. Such an underground cable with 112 pairs of wires (loaded) has been laid between New York and Philadelphia 90 miles long. Nineteen of these pairs are of No. 16 B. & S. gauge for a short distance. The Pupin coils have been fixed at every 1¼ miles, and it works with a commercial ef-

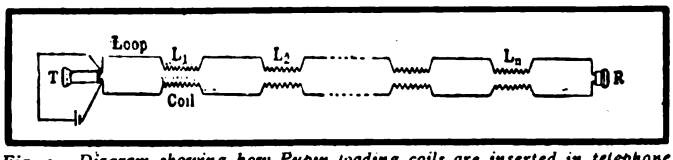

Fig. 2. Diagram showing how Pupin loading coils are inserted in telephone line.

ficiency which Mr. Carty calls a "14 mile talk." The standard of comparison is a mean circuit of 10 miles of No. 19 (1mm) copper wire in the city of New York, which is called the "10-mile talk standard." Each individual section can be shown diagrammatically, as in Figs. 4 and 5. The straight lines indicate the two wires of the loop, the wavy lines the inserted coil. The capacity of the loop is shown as a condenser, and the E.M.F. of the coil as a battery cell. In the diagram they are shown separate at one instant, but in activity they act together to maintain the flow of energy and retain the form of wave. *A. B. C.* represents *time.* It does not represent length of space or distance. In Fig. AY is the rise of the wave when energy is absorbed and held up; (2) is the decap of the wave when energy is restored. Thus is each section energy is held up as the wave is rising and given out again slightly impaired by hysteresis

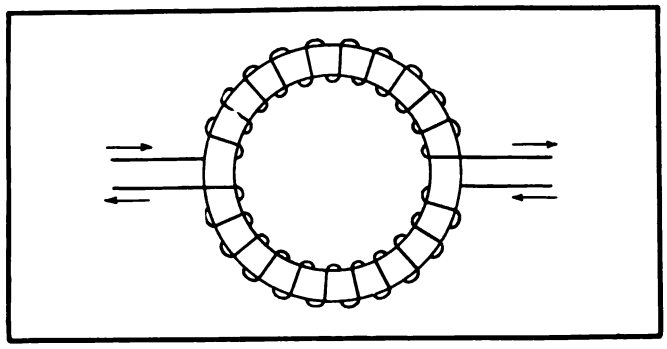

Fig. 3. Path of electric current at a given instant through Pupin coil properly wound and connected.

when the wave is falling. It is evident, from the clearness of speech, that the sum of all these actions results in a continuous flow of alternations without change of frequency when the limiting distance is not exceeded. When this limit is reached the waves are so attenuated that speech becomes impossible.

On the other hand, it must be pointed out that although capacity is greater than inductance in its influence on the current waves, they neither absorb energy permanently. They only hold it up for a time. Energy can be absorbed or it can change its form, but it cannot be destroyed. This is the doctrine of the conservation of energy. Resistance, radiation, and leakage do absorb energy and dissipate it wastefully. Our first object is to prevent waste of energy, and our second object to direct the pent-up energy into a proper channel to maintain the amplitude and form of the waves. This is what Pupin has done. If we

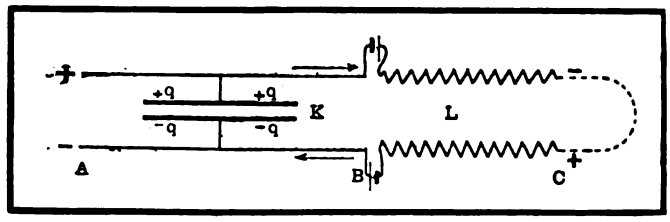

Fig. 4. Diagrammatical representation of section of loaded line in a state of activity.

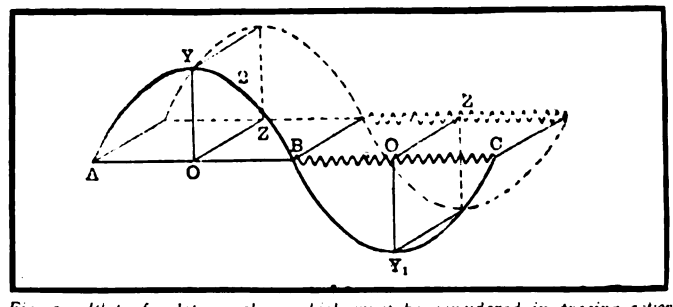

Fig. 5. Plot of relative values which must be considered in tracing action in a loaded line.

represent the action in a Pupin section in another way by Fig. 5, where *A, B,* represents the metallic loop and *B, C,* the double coil, *A, C,* being equal to one complete period of one short fundamental wave, then *O, Y,* will represent the maximum E.M.F. acting during the period *A, B,* and *O, Y,* that acting in the coil during the same period. *Q, Z,* represents the quantity of electricity, *Q,* flowing during the same period; *Q* is assumed constant. The sections *A, B, B, C,* are in tune with each other. A solid figure described by *Q* and *E* (the variable E.M.F.) would represent the energy propagated, except the minute losses in the section, which are inherent to the conditions of the circuit. These losses multiplied eventually absorb all the energy and the limit of speech is reached. The influence of the coils is clearly a time influence. It is a case of tuning. They break up a circuit into a series of sections in which the energy flows in virtually simultaneous steps instead of being prolonged and damped down as it would be in a long submarine cable. The frequency remains unaffected. It is clear that in each wavelength there will be four distinctly marked points, where

*Abstract from a paper read before the British Association, at Leicester, continued from the issue of September 7.

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changes of phase affect the distribution of energy and its factors. It is as though Q remained for an instant in A, B, and E in B, C. They then change partners with an action that continues the forward movement, but with a slight loss due to waste. I regard the action as somewhat analogous to the transmission of mechanical impulses through a line of billiard balls in touch with each other. An impulse (Fig. 6) is imparted by a driven ball striking the first ball, which is compressed, as shown in the figure, by the lower ball; its elasticity by its expansion transmits the impulse to the next ball, with a slight loss of energy, and so on successively through the series until the last ball is impelled away as though no energy has been absorbed. The impulse corresponds to the current, the elasticity to the E.M.F. and the ball to the Pupin section with its capacity (mass), its resistance to change of form and its resilience. This is not unlike the action of air particles against the tympanum of the ear when carrying sonorous vibrations.

The size of coils and the distance apart is mainly a question of experiment. It varies with every circuit; in fact, the solution of the problem is a case of experience and compromise. Sir John Gavey has obtained the best results with coils on long lines at 1⅛ miles and at every two miles on shorter lines; Mr. Carty at every 1¼ mile on long lines, but at every ¾ mile on short lines. The former gets better results with no iron core, the latter prefers fine iron wire as a core. Mr. Gill, engineer-in-chief of the National Telephone Company, places them at

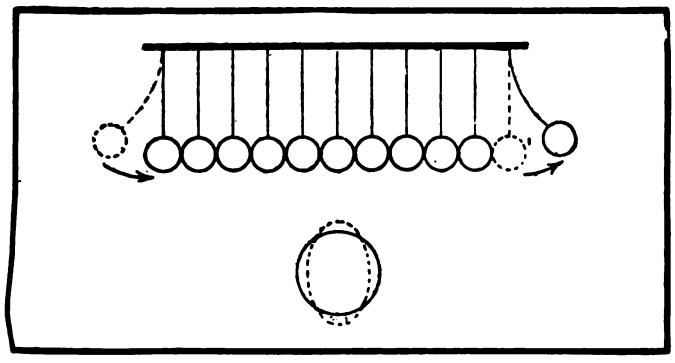

Fig. 6. Illustration of mechanical analogue of transmission over loaded telephone line.

every mile, and uses iron cores. These coils are buried in iron cylinders filled with resin oil, and buried as shown in Fig. 7. It certainly appears to me that iron must experience some hysteresis, though very minute, and, therefore, causes loss of energy, and though it must enhance the strength of the currents by intensifying the lines of magnetic force, it is of more consequence to reduce the loss of energy and retard the attenuation of the waves. If the coils are improperly placed or imperfectly designed, they do more harm than good. Thus coils which are quite effective at every mile destroy speech altogether if placed at every four miles.

Among the numerous disturbing influences are those of the instruments at each end. Not only does the receiving apparatus act as a reflector and inductor, but it is a source of secondary radiation, and it causes interference and attenuation. This is very much aggravated by the constant changes of local lines at each end. Hayes has diminished this disturbance by *tapering*, or the gradual reduction of the inductance of the loading coils as the terminal stations are approached. Tapering is distinctly beneficial. Virtually, as all oscillograms show, it becomes a series of small waves of one frequency, probably, according to Kennelly, of about 800-upper G in the treble, which remains constant. There must be a slight loss of energy in each section of precisely similar percentage. The result is the curve of attenuation must be a logarithmic one, and its logarithmic decrement or attenuation constant is obtainable. The smaller this decrement is made the greater the length of the curve and the further speech can be carried. This is the function of the Pupin coil. The relative and continued attenuation of currents is shown by Fig. 8, where (1) is an unloaded line, (2) a loaded line without tapering, and (3) the same line loaded and tapered. This is due to Mr. Hayes, of the American Bell Telephone Company, who read an admirable paper at the St. Louis Congress in September, 1904.

(To be concluded.)

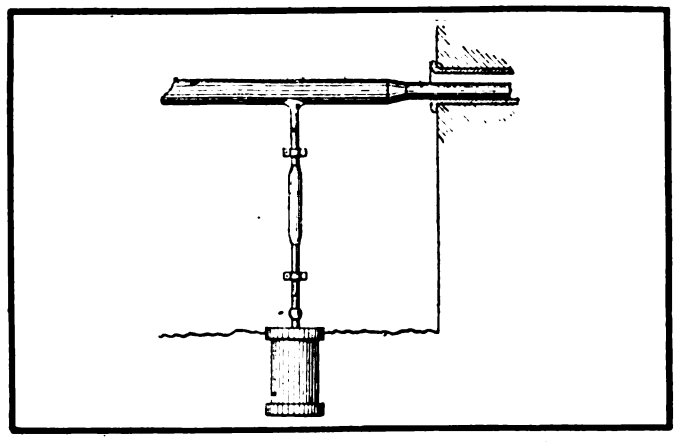

Fig. 7. Method of locating cases for loading coils adopted in England.

INVESTIGATION LIME LIGHT ON NEW ENGLAND TEL. & TEL. CO. AT BOSTON.

A REAL investigation into the practice of the New England Tel. & Tel. Co. of carrying "phantom" workmen on its payroll is being made by District Attorney Moran, according to latest reports from Boston.

District Attorney Moran has occasioned the "haling" of fifty-nine men—officers of the telephone company, public officials, politicians of high and low degree and their relatives—to "tell all they know" to the Grand Jury in the case of Commonwealth vs. the New England Telephone & Telegraph Company.

The discovery of a time book of a former employee is said to have brought to light one of the ways in which the "phantom" workmen were entered on the payrolls of the company. It is reported that one entry showed where a gallon of paint was sent out one day to dress up the belongings of the company on one of the bridges in the city. With it went three or four men to use the paint, two foremen, two sub-foremen, and two watchmen.

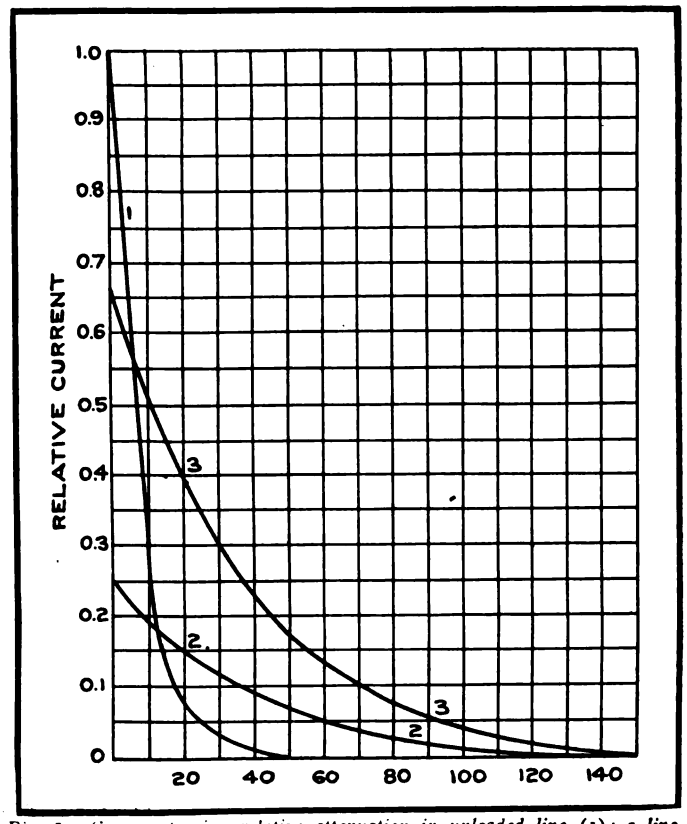

Fig. 8. Curves showing relative attenuation in unloaded line (1); a line loaded, but without terminal tapers (2); and a line provided with loading coils and terminal tapers (3). Vertical lines show distance in miles.

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Editorial Views

TELEPHONE REMOVALS WILL BE SCARCE IN MONTANA.

BUTTE, Montana, a region where labor troubles are not rare, has just had a first rate opportunity to observe what happens to business when faciiities for telephone communication are cut off. The strike of telephone operators was the occasion for an absolutely complete shut down of all exchanges. Without the advantage of an instantaneous method of getting in touch with business associates and friends, people had to fall back upon the old fashioned, inefficient and troublesome plan of traveling about. Grocers who were accustomed to put a boy at the telephone for an hour or so in the morning, to receive steadily the calls of their customers, were obliged to put on extra men and wagons to go out and take orders. Deliveries of goods ordinarily carried out before noon were made in the afternoon and even ran late into the night and household plans were disarranged in thousands of homes. Business men accustomed to telephone and have all business requiring communication finished at an early hour in the day were to be seen hunting vainly about for the persons they wished to talk with, these others in turn being engaged in looking up different persons whom they needed. It was a terrible mix-up for a few days.

Butte people may share the habit of telephone subscribers in other cities and kick strenuously about poor service, but if they see any prospect of its being wholly interrupted they are ready to fight. Even a half-way service is better than walking and cheaper than hiring automobiles. When subscribers in other cities get to thinking that they are not receiving their money's worth, why not take the fuses out of the cable leading to the principal business district and give them, on a small scale, a dose that was so beneficial to the appreciative faculties of the citizens of Butte.

ORGANIZATIONS FOR THE STUDY OF TELEPHONE PRINCIPLES.

LAST year in several of the larger cities of the country and particularly in Boston, Columbus and Atlanta, the Y. M. C. A. organization conducted classes for the instruction of young men anxious to improve their knowledge of the principles underlying telephone work, and methods of exchange construction and operation. This work seemed to cover a useful field and is worthy of promotion in many other places. Not the least of its benefits is the possibility that the publicity gained will be the means of attracting men of a more than average grade of intelligence into the telephone business, owing to the opportunities which they see for preparing themselves for advancement more rapidly than would be possible if they could rely only upon the experience gained during the daily routine.

More or less informal gatherings for the discussion of telephone problems are now held in a great many places where there are compact organizations, comprising telephone men who are not only well posted on their particular specialties, but anxious to learn about the business from all points of view There is no good reason why this plan cannot be much more widely extended. If telephone men would take up the scheme of exchanging their ideas about the business among their own immediate associates, and adopt a good plan for carrying on a systematic series of discussions, they would probably be greatly surprised at the benefits received by all concerned. In order to insure success in such discussions, however, it is always necessary that some man well qualified by actual ability and experience shall have general charge of the organization, as an advisory and presiding officer. Then a course can be laid out that will be fairly well proportioned. It would be a great advantage in such an organization to lay out a program for a whole season in advance, omitting, of course, any personal assignments of subjects for discussion. These who have been active in gatherings of this sort will agree that probably one of the greatest advantages they have derived has been from the investigations carried on in advance, with the idea of fitting themselves to take part in the general discussion, and also of making themselves capable of gathering quickly the points of other speakers as they are given out during the meeting.

The practical difficulty which nearly always confronts one of the higher officials in a telephone company who is sufficiently interested in plans of this sort to attempt to work them out is to convey the benefit of his experience in such matters as arranging a program, and giving suggestions for those who should be qualified to take leading parts in the discussion, without allowing employees to take up the notion that the meetings are strictly "personally conducted" affairs. The trouble is to help to the fullest extent, without suppressing to the slightest degree the individuality of those who should be sufficiently interested to wish to exert themselves to make the plans a success.

On the other hand, the subordinate employees who would like to have it in their power to carry on such a movement for their own advancement find that it is extremely difficult to arouse in a superior officer capable of efficiently guiding their studies and presiding at their discussions, interest sufficient to lead him to take up the work properly. It is hard to disabuse him of the idea that he has not time to go into it. As a matter of fact, it ought to be easy to make him see that it would pay him to to take time for such things as this, but he does not. It is probably true that there is no telephone exchange in the country where the members of the staff, if they would come together every two weeks for the discussion of problems of common interest, could not greatly increase their efficiency.

LEAFLETS FOR ADVERTISING TELEPHONE SERVICE.

TELEPHONE companies are not doing much canvassing for new subscribers just now, but they will take up the question later on. Why is not the present a good time for thinking over advertising stunts to spring on prospective subscribers when an appropriate day comes? Contract departments of some of the larger Bell and Independent companies have prepared very many attractive calendars, folders, etc. An examination of some of those most striking in appearance and useful shows that each one drives home a single idea. The basis of the printed matter and illustration in each case is that under the circumstances referred to the telephone is well nigh indispensable.

There is a good opportunity for some man, or some group of men, to design a set of such folders which will properly cover with some approximation to completeness the entire field in which the telephone is indispensable as a means of communication. Then solicitors will be able to leave with each "prospect" something which will get in good effective work after they have left the man as a "hopeless case" for the time being. Printer's ink and paper are cheaper than conversation paid for by the hour, and if telephone men can write strong and interesting advertising copy, in sufficient variety to convey a direct personal appeal to the interest of each prospective customer, they will save themselves a great deal of trouble and expense.

Of course, there is more to the proposition than the writing of copy and the preparation of circulars. The solicitor must have the right printed arguments, and be able to present them in the right manner, at the right time. It does little good for him to leave a bunch of folders, to let the person whom he is interviewing choose from, or throw in the waste paper basket, at will. The proper idea is to give the solicitor a whole line, and let him pick out when he is talking to his man the single piece of paper that he needs to clinch an argument, and put the person he is interviewing in a condition to appreciate the advantages of the service at the second visit. If put together rightly, the personal element and the sound argument well and permanently set forth on paper will make a combination hard to beat.

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Legal Snares Untangled

CONDUCTED BY A. H. McMILLAN.

SUBSCRIBER'S RIGHT TO OWN EXTENSION SET IN NEW YORK.

We would thank you very much to inform us as to whether the following points have been passed upon by the courts of this State, and if so, what the general purport of the decisions has been:

(A) As to whether a subscriber has the right to purchase a telephone, and connect it to the wires leading to his regular instrument, using the purchased one as an extension telephone. Has any distance been fixed between the regular and extension instruments, beyond which an instrument ceases to be an extension instrument? That is, if wires to the extension telephone are run a half of a mile from the company's instrument, could the telephone properly be called an extension instrument?

(B) As to whether a subscriber has the right to purchase an extension bell, and attach it to the wires leading to his telephone.

We enclose blank contract form of the company in question. If these points have not been determined in this State, would thank you for any information you may be able to give. M. P. N. Co.

THERE has been no decision in the courts of New York upon the subject of the right of a subscriber to connect his own instrument to the wires of a telephone company and use the instrument as an extension telephone so that both of the questions you ask are undecided so far as the State of New York is concerned. The only known decision on the subject was in Rhode Island, the case being that of Gardner vs. Providence Telephone Company, 49A, 1004. It was there held that a company might not forbid the use by a subscriber of a private set of extension instruments and refuse him the use of its line where the company was unprepared or neglected to furnish approved appliances of that kind or demanded exorbitant rates, the use of such set by a subscriber causing no detriment to the company either in its demand upon services or in safety.

TELEPHONE POLES IN STREETS OF NEW YORK CITIES.

ALONG looked for decision in the State of New York has settled the question of the rights of abutting owners in the streets of a city so far as the setting of telephone poles therein is concerned. Decided cases in that State have thus far touched the rights of urban abutters only by way of *dictum*. The editor has recently had some interesting discussion with a subscriber on the question, the editor hesitating to accept the *dicta* of the courts as law until actually followed in some decided case. The courts have recognized the fact that there might be a decision between the rights of abutting owners in city streets as distinguished from their rights in rural highways. The case mentioned is the first in which that distinction has been actually applied.

This action was brought by George O. Gannett, of Syracuse, against the Independent Telephone Company of that city and the Syracuse Telephone Company to restrain them from placing a pole and stringing wires in front of his premises. He maintained that the telephone people were atempting to act in violation of the express ordinances of the city of Syracuse bearing upon the subject and were creating a public nuisance which would result in special injury to his property.

Justice De Angelis, of the Supreme Court, decided the case in favor of the companies, dismissing the complaint and dissolving the temporary injunction, but, in view of the supplemental answer, without costs to any of the parties.

In 1899 the common council of the city passed an ordinance giving the Syracuse Telephone Company the right to erect poles and string wires in the streets of the city and requiring, among other things, that the poles be erected and maintained at such points as least to obstruct the streets or interfere with their usefulness and in suitable places with reference to trees standing in the streets and requiring the approval by the common council or commissioner of public works of the location and character of the poles, etc. On January 7, 1901, the council passed an ordinance requiring the company to place its telephone wires underground and not upon poles erected in the streets. The defendant Independent Telephone Company was organized June 30, 1905. It acquired all the capital stock of the Syracuse company and made use of its exchange. On October 30, 1906, the Independent Telephone Company began the erection of a telephone line on Townsend street, where Mr. Gannett resides. Mr. Gannett secured a temporary injunction. The Independent company had not then obtained from the city any consent for the proposed line. On December 11 the council repealed the ordinance requiring the Syracuse Telephone Company to place its wires underground and passed another ordinance requiring the Independent company as a successor of the Syracuse company to file applications, with maps, for all proposed extensions. The Independent company thereupon filed application and maps for the Townsend street line and the consent of the commissioner of public works was obtained.

In his opinion the justice briefly reviewed the case and stated that the fundamental question involved was whether or not the use of a city street for the maintenance of telephone poles and wires was a street use. He referred to the Eels case against the American Telephone and Telegraph Company as establishing the rule of property in the State to be that the maintenance of a telephone line in a country road is an additional burden upon the highway. Then, continuing, he said: "But a distinction has been made between city streets and city rural roads or highways in respect of the public easement. Whether this distinction is well founded in its last analysis does not require discussion here. In the present condition of the adjudicated cases I think I am required to hold that the maintenance of a telephone line in front of the plaintiff's premises on Townsend street is within the public easement and a proper street use."

SALE OF FRANCHISES IS OBLIGATORY IN KENTUCKY.

THE constitution of Kentucky declares that, before granting a franchise to use the streets of a city "for a term of years," the municipality shall first, after due advertisement, receive bids therefor publicly. These provisions of the constitution have been construed to be self executing and not to require an ordinance of the general council of the city to make it obligatory.

The case in which this ruling was made was brought by the Citizens' Telephone Company against the Merchants' Police and District Telegraph Company to enjoin it from operating a telephone business in the City of Covington. The plaintiff owned a telephone plant in the city and was operating under a franchise obtained as directed by the constitution. The only right the defendant had in the city was a permissive grant from the city council for an indefinite length of time. Its contention was that the plaintiff could not enjoin it because the plaintiff's right to the use of the city streets was not exclusive. It also alleged that its right to the use of the streets was not for a term of years but terminable at the pleasure of the general council, and therefore not in conflict with the constitution. The plaintiff contended that defendant had no right in the city because it had not obtained its franchise as required by the constitution.

The Court of Appeals of Kentucky decided in favor of the plaintiff, holding that the Citizens' Telephone Company was operating its business without authority of law and that the attempted grant to it by the council was void. The only case where the council could grant a franchise without following the methods provided in the constitution was where the council might give a franchise for a short time, for temporary purposes, and less than a term of years. In such a case, said the court, the limit of time should be expressed in the ordinance. Merchants' Police and District Telegraph Company vs. Citizens' Telephone Company, 93, S. W. 642.

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News from Operating Centres

MISSISSIPPI INDEPENDENT COMPANIES PROVE PROSPERITY BY OFFICIAL REPORTS TO STATE.

ACCORDING to the reports filed with the Railroad Commission of Mississippi all the small Independent telephone companies doing business in that State have been prosperous this year. Nearly all of them have been able to show a net surplus over operation and interest and some have declared handsome dividends. For the first few years these companies operated most of them had great difficulties, being involved in a fierce struggle with the Cumberland company, the Bell company operating in that territory. The sentiment of the public has been with the Independent companies, however, and they have built up their business, extended their lines, etc., until they are able to make a show on the right side of the ledger. All last year the Cumberland company's officials distributed circulars all over Mississippi advising farmers and others to let telephone investments alone, contending that all small companies would ultimately have to fail. Whether imaginary or not, many cases were cited where farmers had lost great sums of money in attempting to operate telephone systems, and every other method was used to prevent the building of the Independent lines. They were built, however, and now most of them are on a good paying basis and showing steady improvement.

FORGET "PLEASE" WHEN IN PHILADELPHIA.

BREVITY is not only the soul of wit, but also the saver of time and a wonderful help toward perfect telephone service. Application of this is very clearly shown in an order issued by A. J. Ulrich, traffic manager of the Keystone Telephone Company of Philadelphia, to the four hundred and fifty operators, who will hereafter use only the word "Number" in answering a call. The girls are highly elated over the order and the subscribers are just as happy, for they have been requested to dispense with the word "please" in requesting a connection.

Mr. Ulrich estimates that the girls in answering calls and the patrons in making them use the word 900,000 times every twenty-four hours. Allowing half a second for each time the word is uttered, 7,500 minutes, or 125 hours, are consumed and lost every day through courtesy, which when considered in these days of three second service means a loss of 300,000 possible connections. On a measured service basis of operating, just imagine if you can the hole the word "please" makes in the revenue of a telephone company. And yet there are some people who say that courtesy pays. It does, but one has to exercise discretion.

INDEPENDENTS CONTROL TELEPHONE SITUATION IN CASS COUNTY, MICHIGAN.

THE Cass County Home Telephone Company of Dowagiac, Michigan, has recently purchased, for cash, the entire property of the Cassopolis Telephone Company, including the exchanges which that company operated in Cassopolis and Marcellus.

By the terms of the sale the Home Telephone Company gets all of the lines, equipment and exchanges of the Cassopolis company comprising toll lines to twelve surrounding villages and in all a total of over six hundred telephones. The two exchanges will be connected with the system of the Home Telephone Company and will be henceforth a part of the comprehensive Independent system which the Home Telephone Company has been for some time building in that county.

In securing this system the Bell telephone Company was badly beaten out, as it had been for some time endeavoring to purchase these exchanges and lines. It has also held a connecting agreement with the Cassopolis company for service over the system, which under the present conditions will be discontinued and will afford Bell subscribers in other points no opportunity of reaching the people on this system.

This purchase will give to the subscribers of the Home Telephone Company free telephone service to any point on the tem acquired, which is greatly appreciated by the citizen Dowagiac. Cassopolis being the county seat, more connec are desired with that point by the Dowagiac people than to other six points in the county.

M. W. Briggs, manager of the Home Telephone Com who carried the deal through, is now engaged in the const tion of lines from Dowagiac to Cassopolis, from Three Ri to Cassopolis, from South Bend to Cassopolis, from G Rapids to Cassopolis and from Dowagiac to Volinia.

ONE OF THE TRICKY METHODS OF MEETING COMPETITION IN THE TELEPHONE BUSINESS.

THE Home Telephone Company and the Cumberland Telephone and Telegraph Company are having a merry war at Hartsville, Tenn. The Cumberland (Bell) has been operating an exchange uninterruptedly in Hartsville for many years. Recently the Home company was organized by residents of the city and county and a line was built out to Lafayette and other towns to connect with the Home company's trunk line from Louisville to New Orleans. The local organization then secured a building and began constructing lines for the local system. Hartsville had a law providing that no new company should stretch its wires underneath those of the Cumberland company, meaning that the new company would have to erect poles higher than those of the Cumberland. Just before the Home company began connecting wires up to its building the Cumberland company sent in a crew of workmen and they erected the highest poles to be had around the new company's building and elevated the wires. It would be practically out of the question for the new company to get higher poles than the Cumberland had, so there was much consternation created. Many Cumberland subscribers took out their telephones and others threatened to do so. The new company states it will erect higher poles than the Cumberland if it has to use steel unless the city council can force the Cumberland company to cut off its poles.

QUICK WORK AT TOPEKA.

ON example of the "git up and git-iveness" of the western Independent telephone companies is shown by a recent letter from W. P. Hemphill, secretary of the Topeka Independent Telephone Company, Topeka, Kansas, which is in substance as follows:

"Some days ago careless workmen who were excavating for a water pipe line bored through the cement, conduit and lead casing of one of the company's big 400 pair underground cables, putting out of service between 600 and 700 telephones.

"The accident happened about 4 o'clock in the afternoon only a few days after the company had made the cut-over into its new exchange building at 812 Jackson street, hence it was urgent that no time be lost in repairing the damaged cable, as the service had already been disarranged on account of the change of location. Accordingly a gang was organized consisting of two first-class cable men with helpers and enough ground men to clear away the dirt and uncover the conduit. When the damaged part of the cable was reached it was found that the augur which the workmen had used in their effort to pierce what they had thought to be a large stone, but which in fact was the cement casing surrounding the conduit, had pierced the cable squarely through the center, severing many of the wires completely and those not severed were in a tangled shape with the insulation torn off.

"Fortunately enough slack had been left in the cable in a nearby manhole to allow the cable men to sever the cable without splicing in an additional piece. The cable being severed the task of putting the telephones again in operation was commenced. In order that each subscriber should be placed on his correct number it was necessary that a test be made with each telephone and then with the wire chief at the office."

The work of testing was kept up continually during the night,

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FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—1,000 American Electric 80 ohm series telephones at a price that will interest you. Write to-day. The Tuscarawas County Telephone Co., New Philadelphia, O. 925

FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

POSITION wanted by a young man, 26, having 5 years' experience on all kinds of telephone cable splicing, or would like to go power splicing at any wages reasonable. Address, Box 922, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 922

OPEN for engagement: Construction engineer, American, married; civil engineering education, now employed with a large Bell Telephone Company, wishes a position as manager or engineer with smaller company. Expert estimator and capable executive, thoroughly conversant with development, transmission, construction work and telephone exchange building. Can absolutely produce results. Correspondence solicited. Address Box 923, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 923

WANTED—Experienced central energy wire chief, 3,500 subscribers, new equipment, everything first class, married man preferred, must have reference. The Tuscarawas County Telephone Co., New Philadelphia, O. 924

WANTED—A young man with seven years' practical experience in maintenance and construction work with the Bell company in the West, desires some position of responsibility with chances of advancement. First class private exchange installer. Address Box 926, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 926

WANTED---Continued

POSITION by good switchboard or instrument man. Married, sober, not afraid of work; wish steady position, where a steady cause is appreciated. Satisfactory references. Territory matters not. Let me hear. Address Box 927, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 927

WANTED—Permanent position by telephone man experienced, as manager or electrician. Capable of giving good service to subscribers and dividends to stockholders. References. Four years last position. Use neither liquor nor tobacco in any form. E. J. Pitrat, 210 S. Grove St., Urbana, Ill. 910

WANTED—Young Telephone Engineer desires position as Manager of an Exchange from 500 to 3,000 subscribers. Capable of handling the business as well as electrical end. Six years' experience in all branches of telephone work. Technical graduate. Address Box 905, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 905

CABLE SPLICERS furnished, familiar with both telephone and electric, all with at least five years' experience. Address Box 895, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 895

WANTED—Position with telephone company east or central west. Fifteen years' experience as general foreman of construction and maintenance of lines. Address, Box 901, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 901

WANTED—Position in Engineering Department by experienced man familiar with modern methods in exchange cable and pole line construction. Best of references. Address Box 904, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 904

YOUNG man, married, employed in responsible semi-executive position, desires change on account of present work too confining. Eight years' experience in installation, maintenance, construction and traffic work. College education (technical). Able to handle men. Address, Box 919, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 919

WANTED—Position by two operators, one as chief. Southern States preferred. Salary from $8.00 to $10.00 a week. Best of references. Address Box 928, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 928

MONNOT COPPER-CLAD WIRE COSTS LESS AND IS SUPERIOR

FOR TELEPHONE PURPOSES

Superior to Pure Copper, Combines Tensile Strength, Elasticity and Durability.

to Pure Copper Wire, as it affords the non-oxidizable, acid-proof qualities of copper—combined with the tensile strength and high elastic limit of steel. This is

Monnot Copper-Clad Wire

(A Steel Wire with Non-porous, Welded Copper Coat.)

Let us send you our booklet. It tells the story.

DUPLEX METALS COMPANY

208 Fifth Avenue, New York City

WORKS AT CHESTER, PA.

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much to the annoyance of subscribers. Some not knowing the cause for such unusual energy on the part of the telephone company to keep their telephones in order were at first inclined to censure it seriously for their being called from peaceful slumbers to be only asked the question of what their telephone numbers were, but when these same subscribers learned the extent of the accident and what it meant to have several hundred telephones out of order in the business district, their censure was turned to praise for completing a piece of work which would have taken some companies days to have done, in less than sixteen hours.

NEW EQUIPMENT FOR CAIRO, ILL.

THE Home Telephone Company, of Cairo, Ill., is about to award contracts for new equipment and the complete rebuilding of its exchange system.

The new exchange will be located in the McHale building, now in course of construction. The portions which will be occupied by the Home Company are designed for the most advantageous location of exchange equipment.

CUMBERLAND COMPANY MUST PUT WIRES UNDERGROUND OR LOSE POLES AT CLARKSVILLE, TENN.

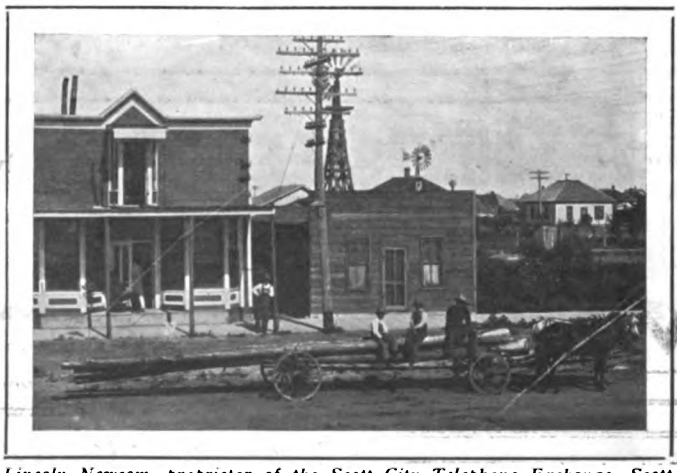
IF the Cumberland Telephone & Telegraph Company does not proceed at once to put its wires underground in Clarksville, Tenn., the poles and wires inside the city limits will be cut down. This is the substance of a resolution passed by the Clarksville city council at a meeting September 5, and Mayor Northington declares that he will carry out his order.

Last December the council passed an ordinance requiring the telephone companies to put their wires underground inside the congested district. The Cumberland company was notified, but until a few days ago had paid no attention to the order.

Mayor Northington states that the ordinance was passed as the direct result of the company's wires so interfering with the fire department on an occasion when a fire raged in the business district that they could not control the fire and over $100,000 worth of property was destroyed. President Caldwell of the Cumberland Company at that time wrote the mayor asking the right to put his wires underground. The ordinance was passed and a copy served on the company but that was the last of it. Mayor Northington says the company made this proposal purely for political effect, and if it does not begin work at once he will remove every pole and wire from the streets. In a letter under date of September 7, President Caldwell states that the ordinance forcing wires underground is unsatisfactory to the company and it will not comply with the order.

KENTUCKY COMPANY ISSUES DIRECTORY CARRYING MUCH ADVERTISING OF HOME FIRMS.

THE Todd County Home Telephone Company, of Elkton, Kentucky, has recently issued a subscribers' directory, comprising the names of all the subscribers to Independent telephone service in Elkton, Trenton, Allensville and Guthrie, Ky. The directory presents a very neat and pleasing appearance, which is largely enhanced by the use of a large shield in colors prominently displayed on the front cover. A profitable feature is the use of a two-inch space at top and bottom of each page for advertising the business of many of its patrons, or setting forth the prominent features of its service. An invitation to try the Independent long distance service which appears at frequent intervals is an advertising device which should be more often adopted by Independent companies.



Lincoln Newsom, proprietor of the Scott City Telephone Exchange, Scott City, Kan., writes: "I own the central office building; there is no continual expense for rent, and I can make what changes I please." A good idea for all Independent companies of moderate size!

ANOTHER BELL COMPANY GONE UNDER—CITY OF OAKLAND, CAL., SEIZES FAKE SYSTEM USED TO FIGHT INDEPENDENTS.

ALL of the telephones and equipment installed in the city of Oakland, Cal., by the Pacific States Telephone Company (Bell) to embarrass the Home Telephone Company, has recently been taken charge of by the city electrician.

The company, which was locally known as the Beasley concern, was started about the time the Home Telephone Company was preparing to enter that field, its sole object being to fight the Home Company by discouraging patrons in the class of service afforded by automatic apparatus.

Several months ago the city council forfeited the Beasley franchise, the company having failed to do the amount of work required in the ordinance granting the franchise and having failed to operate a bonafide telephone system and give real service. The officials of the company then put in a plea for the return of some of the money they had paid for the privileges they never used. The city returned $1,500 with the understanding that the property of the telephone company which had been placed on the streets of the city could be removed and retained by the city.

Upon the expiration of the lease of the building in which the switchboard apparatus was installed, no one could be found who would claim the apparatus, so the city electrician has removed the entire equipment. It is estimated that the apparatus and construction material is worth about $10,000, which makes the city's purchase for $1,500 quite a bargain!

It will be amusing if the Bell Press Bureau follows its usual practice and heralds this over the country as another Independent failure.

POLITENESS IN NEW YORK.

NEW YORK telephone operators are said to be justly indignant over the new book of operating rules just issued; justly indignant, because the rules positively insist that an operator shall always be pleasant and courteous. This of course is an indiscreet reflection on the girls, because they are so naturally.

The two following "rules" will give an idea of the general trend:

"Operators are hereby directed when answering subscribers to speak in a pleasant tone of voice. No deviation from this rule will be tolerated by the company hereafter.

"Operators, when requesting patrons to put money in the slot, must positively employ the expression 'please.'"

The company has evidently been receiving complaints, and wishes to take advantage of the old adage about the "soft answer."

These, as against the orders recently issued in Philadelphia to operators in which the word "please" is put under a ban, will, we are inclined to believe, cause friend Bok, editor of the *Ladies' Home Journal*, to hunt around very quickly to find the reason for New York's "courtesy wave" as against his own Philadelphia's backsliding.

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What Percentage of Printed Copies Goes to the Pulp Mill?

Note the line on the reproduced circular guaranteeing "that each and every copy received shall go to our paper mill and be destroyed."

Junk paper dealers make a business of preventing great loss to those publishers creating special circulations at their own convenience to fool their advertisers.

Every publisher receives circulars similar to this one:

CHASE & NORTON

PAPER MAKER'S SUPPLIES

277 Water Street

New York

Telephone 630 John

We should be pleased to purchase the return or over issue copies of your magazine and pamphlet publication as waste paper.

We send men to bag it up and take it away and pay prompt cash.

We also guarantee that each and every copy received shall go to our paper mill and be destroyed.

If printed on rag paper we will pay you 65 ..... cents per 100 pounds.

When you have an accumulation of 1,000 lbs. or over, if you will advise us by telephone or mail, we will be pleased to send for it.

This quotation is subject to change without notice.

Yours truly

CHASE & NORTON

Date SEPT. 5, 1907 .....

It is plain that American Telephone Journal does not patronize junk paper dealers.

The Journal presented its post office receipts when called on by the President of the Telephone Manufacturers and for the month requested---**AUGUST.**

These receipts showed that the August circulation of the Journal in the United States and Mexico was

27,040

These figures are guaranteed by the United States Government.

The total August circulation of the Journal was

30,244

This includes the copies mailed with stamps affixed to Canada and foreign countries.

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Answers from Experience

COLLECTING RURAL RENTALS.—(914.)

What is the best and most economical system of collecting for a country telephone system of 300 to 500 subscribers? Is there any better way than to send a man over the territory quarterly? Our line goes over such hilly country that it is slow work collecting this way. How much should a collector be paid, he to furnish his own horse and rig and the telephone company to pay for meals and horse feed while on the road collecting?

What compensation should the secretary of such a company receive for his services per year? H. J. B., Penna.

R. B. Fegan, manager of the Ithaca Telephone Company, Ithaca, New York, replies to this query, first published in our issue of August 31, as follows:

"We believe that we can assist the gentleman asking this question somewhat by describing the system we use for making collections for service from our rural subscribers. We notify our subscribers by post card, the form of which is shown in Fig. 914*a*, the first of each quarter of the amount due us for service, and at the first of the last month of the quarter we forward to them postal cards printed in the form shown in Fig. 914*b*. Thus you see that we have reminded them twice for the small sum of two cents and furnished them a statement of exactly the amount they owe to the company for service.

"If the 10th of the last month of the quarter arrives and they have not reported at our office or settled the account, either by check or in some other manner, we write them a courteous letter advising that we are obliged to settle our accounts as manager of the company at the end of each month, and asking that they please favor us with a remit-

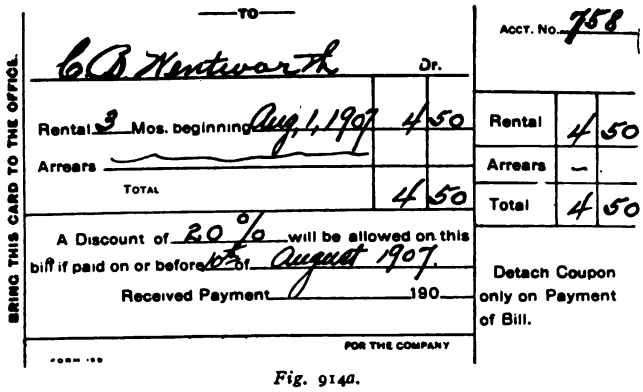
TO
C B Kentworth
Dr.
ACCT. No. 758
BRING THIS CARD TO THE OFFICE.
Rental 3 Mos. beginning Aug 1, 1907 4 50
Arrears
TOTAL 4 50
Rental 4 50
Arrears —
Total 4 50
A Discount of 20 % will be allowed on this bill if paid on or before 10th of August 1907.
Received Payment 190
Detach Coupon only on Payment of Bill.
FOR THE COMPANY

Fig. 914a.

tance before that time. We also use in connection with this, as a silent collector, a rubber stamp bearing the statement as shown in Fig. 914*c*. Of course there are some subscribers whom we are obliged to call up in relation to their rentals, and this we do on the 26th day of the last month of the quarter, giving them the balance of the month in which to remit.

"We are handling at present over 500 rural subscribers with this system and find upon examination of our books that 98 per cent. of this number pay the rentals the first and second month of the quarter, while the other 2 per cent. usually square up before the end of the third month of the quarter. We do not allow our accounts to run over longer than the 10th of the month in the next quarter so that we are not bothered with uncollectable accounts."

The Editor will be pleased to see further suggestions from other managers who have successfully dealt with this problem in exchange operating.

CUTTING OUT C. B. RECEIVER CLICK.—(915.)

In common battery systems generally, we have noted that when an operator inserts her answering plug in the calling subscriber's jack, a disagreeable click is experienced by the calling subscriber. We understand also that there have been some systems devised in which this click is eliminated. Can you advise us as to what these systems may be or the method whereby this disagreeable feature may be overcome? O. I. J.

This problem is one on which the various manufacturers have spent much thought and labor. Many schemes have been devised for the elimination of this trouble, but as yet nothing has been tried which absolutely cuts it out that does not in some manner affect the circuit to produce more or

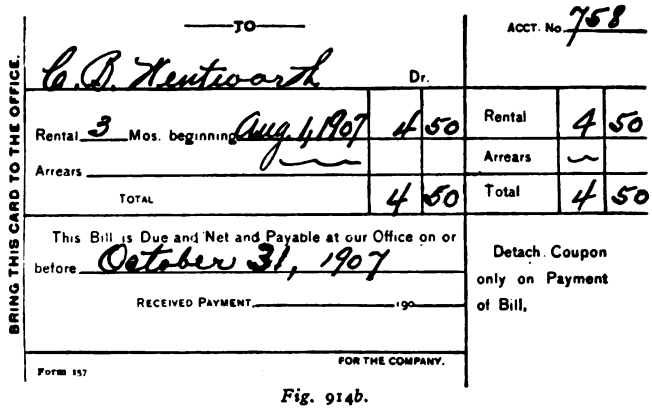
TO
C. B. Kentworth
Dr.
ACCT. No. 758
BRING THIS CARD TO THE OFFICE.
Rental 3 Mos. beginning Aug 1, 1907 4 50
Arrears
TOTAL 4 50
Rental 4 50
Arrears —
Total 4 50
This Bill is Due and Net and Payable at our Office on or before October 31, 1907
Received Payment 190
Detach Coupon only on Payment of Bill.
FOR THE COMPANY.
Form 157

Fig. 914b.

less objectionable results. Some manufacturers, however, have reduced it considerably until it is scarcely noticeable.

The trouble is more pronounced on three wire systems than those of the two wire type, due to the ring of the plug touching the sleeve contact of the jack and causing a discharge from a condenser or impedance coil to flow out upon the line and through the subscriber's receiver. It is also occasioned by the short circuiting of the line by the operator when she inserts the plug in the jack. In non-multiple or series multiple systems the line is sometimes opened before it is in circuit with the plug, and thereby gives the subscriber the full charge of the battery in the receiver.

Some of the manufacturers have avoided this trouble by making the ring of the plug smaller than the tip and sleeve, thus not allowing it to touch the sleeve of the jack during insertion. Others have connected the battery direct to the line, not removing it at any time and thus avoid a large portion of the "kick."

OPERATION OF KEYS ON WHEATSTONE BRIDGE.—(916.)

Some time ago we purchased a Wheatstone bridge for use in making measurements on our system. In reading over the instruction for operation of the bridge I notice that one is supposed to close the galvanometer key after operating the battery key, and to open it before releasing the pressure on the battery key. Why is this? The writer has tried it both ways and cannot note any difference in the operation of the instrument. S. J. B.

The battery key should always be closed first as the galvanometer is then protected from self-induction currents. Sudden

I am required to close my accounts with the company immediately after end of each month. Will you please send check promptly, or call at the office, or 'PHONE US AND WE WILL HAVE OUR COLLECTOR CALL ON YOU?

Errors, if any, will be as promptly adjusted after as before payment of account. Make checks payable to order of ..... Telephone Company.

.....Mgr.

Fig. 914c.

violent deflections of the galvanometer which would occur if the bridge were not near adjustment are thus avoided. These violent deflections, if permitted, are very likely to cause errors in the readings of the galvanometer and in cases of reflecting galvanometers, where the mirror is suspended by a silk fibre, the latter may be broken.

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Telephone Manufacturers' Association Asked August Circulation American Telephone Journal's Was 30,244 And We Proved It

Advertisers advertise for results. They don't particularly care what the circulation of any paper is so long as they receive inquiries and that these inquiries are from a class having the purchasing power.

A publisher, if his conscience is easy, can claim anywhere from six to nineteen thousand circulation for his paper, even if it is only four thousand or less a month. And this claim may influence a few concerns that don't take the trouble to look into the merits of the paper and consider it from the real circulation basis—strength of the reading pages, and their interest to the buyers of the class reached.

Such a publisher may even issue a *sworn* statement, backed up by a printer's *sworn* statement. A sworn statement is good so far as it goes.

But such a sworn statement shows only the number of copies printed.

It doesn't satisfy an advertiser as to the number of copies circulated and the number of readers of the paper.

For these reasons AMERICAN TELEPHONE JOURNAL has never issued sworn statements and has had little to say about *quantity* of circulation—dwelling on *quality* principally.

United States Post Office receipts are the only unfailing evidence of actual circulation within the United States, its possessions, and Mexico.

Probably the publishers of AMERICAN TELEPHONE JOURNAL would not have gone into this circulation talk at all had it not been for the action taken at the last meeting of the TELEPHONE MANUFACTURERS' ASSOCIATION.

At this meeting, the following resolution was passed:

"RESOLVED, that the President of this Association be directed to secure properly audited reports of the circulation of the different telephone trade journals and report at the next meeting of this Association."

AMERICAN TELEPHONE JOURNAL received a copy of this resolution on August 21st. It was accompanied by a letter dated August 19th, from the President of the TELEPHONE MANUFACTURERS' ASSOCIATION, which letter presumably was sent to the other telephone journals.

The letter follows:

"The writer respectfully requests that you forward a certified copy of Post Office receipts for the second week in *August* and statement showing number of paid subscriptions at that date.

"The members feel that in buying their advertising they should be correctly informed as to the circulation of the several publications.

(Signed) "J. G. IHMSEN,
"President Telephone Manufacturers' Association."

By return mail the President of this Association was forwarded the POST OFFICE RECEIPTS of AMERICAN TELEPHONE JOURNAL not alone for the second week in August, but for all the issues in that month up to the receipt of the letter. Those receipts are now in the hands of the President of the Manufacturers' Association, and no doubt can be seen by any advertiser interested. (Post Office receipts for the remaining August issues of American Telephone Journal have since that time also been forwarded to the Association President.) They were accompanied by the following letter, mailed within two hours of the receipt of Mr. Ihmsen's request:

"Answering your favor of the 19th asking for a certified copy of the Post Office receipts of AMERICAN TELEPHONE JOURNAL for the second week in August, we beg to hand you herewith the ORIGINAL post office receipts for our issues of August 3d, 10th and 17th. The original Post Office receipts for the issues of August 24th and 31st will be forwarded to you as soon as received by us.

"Canadian and Foreign circulation IS STAMPED. Our PAID circulation is 4,643.

"The AMERICAN TELEPHONE JOURNAL heartily endorses the policy of your association in seeking information as to the circulation of the telephone press. If any other information on the subject of circulation is desired, the writer will take it as a favor to be asked to attend your next meeting.

"AMERICAN TELEPHONE JOURNAL.
(Signed) "W. H. McDonough, Pres't."

In response to this letter we were in receipt of the following acknowledgment:

"The writer begs to acknowledge your esteemed favor of the 21st inst. enclosing post office receipts as stated.

"The members will be pleased to learn that you favored their desire for a wider knowledge of conditions as they exist, and I wish to thank you personally for your prompt reply.

(Signed) "J. G. IHMSEN,
President, Telephone Manufacturers' Association."

The Post Office receipts forwarded to Mr. Ihmsen showed that the copies of AMERICAN TELEPHONE JOURNAL mailed to readers in the United States and Mexico during the month of August weighed 8,112 pounds, or over 4 tons.

Each copy of the JOURNAL with WRAPPER weighs on an average 4.8 ounces.

So that the POST OFFICE RECEIPTS forwarded to Mr. Ihmsen show that 27,040 copies of the Journal were mailed during August to readers in the United States, its possessions and Mexico.

This circulation is GUARANTEED BY THE UNITED STATES GOVERNMENT.

But in addition, the publishers have forwarded to Mr. Ihmsen a certified statement from AMERICAN TELEPHONE JOURNAL'S printer and also from a public accountant.

Copies of the Journal mailed, with stamps affixed, during August to readers in Canada and other foreign countries, and sales to news companies, brings the actual circulation of the Journal up to the splendid total of 30,244 copies.

This is why the following line will appear regularly on the front cover of the Journal:

THE CIRCULATION OF AMERICAN TELEPHONE JOURNAL IS GREATER THAN THE COMBINED CIRCULATION OF ALL OTHER TELEPHONE PAPERS IN THE WORLD

WARNING TO ADVERTISERS

The Telephone Manufacturers' Association asked for circulation figures for the month of AUGUST.

It did not say anything about September or last January or next December.

The resolution and Mr. Ihmsen's request came without warning to any of the telephone publications. The figures given by American Telephone Journal show its AVERAGE CIRCULATION AND NOT A SPECIAL CIRCULATION MANUFACTURED FOR A SPECIAL PURPOSE AND GOTTEN UP AFTER THE PUBLISHER HAD A CHANCE TO PREPARE FIGURES.

Insist on Seeing the Figures for the Month of August

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Most Recent Telephone Patents

RECEIVER CIRCUIT CLOSER.

H. G. Pape, New York, N. Y., patent 864,858, September 3, 1907.

This invention relates to a novel telephone receiver constructed with special reference to its use as the earpiece of an audiphone set, which latter is used as an aid to defective hearing, and comprises an earpiece electrically connected to a sound receiver corresponding in function with the transmitter of a telephone apparatus, and is a division of application made by Mr. Pope June 16, 1904, serial No. 212,819.

The primary object of the invention is to provide in connection with a receiver and head band therefor, an automatic circuit closer coöperating with the head band to close the circuit through the instrument when the band is placed upon the head to position the receiver at the ear.

This is accomplished by the use of any one of several different switch combinations mounted in the receiver in such a manner that the head band will exert a pressure on one of the contact points when the receiver is on the head of the operator and thus close the circuit as desired.

GUY ANCHOR.

E. W. Swartout, Aurora, Ind., patent 864,392, August 27, 1907.

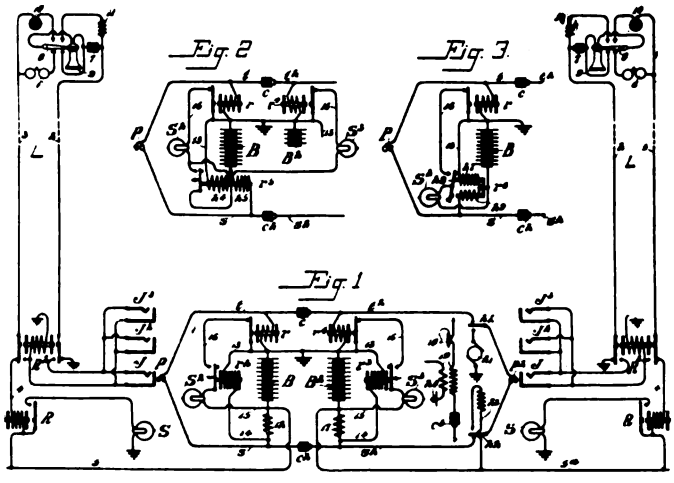
This anchor consists of a base plate of iron slightly "dished" so as to assume a concavo-convex form. One end of the plate is rounded at the corners and is substantially blunt, while the other end is extended and somewhat pointed. Through the center of the plate is passed a rod loosely accommodated to which may be attached the guy strand.

The hole into which the anchor is to be placed has a diameter smaller than the length of the base plate from the pointed to the blunt end. When the anchor is inserted it is therefore necessary to "tamp" the blunt end of the plate, which causes the pointed end to engage with the solid earth. The hole is then filled and the earth tamped in to provide a solid holding surface.

SUPERVISORY SYSTEM.

W. W. Dean, Chicago, patent 864,887, Sept. 3, 1907, assigned to K. S. & S. Co.

In this system an additional relay is associated with each end of the cord circuit to prevent the operation of the supervisory signals under normal conditions. This relay is actuated under normal conditions to open the circuit of the supervisory, but when the connection is established is deënergized or reversely actuated to permit of the closing of the circuit.

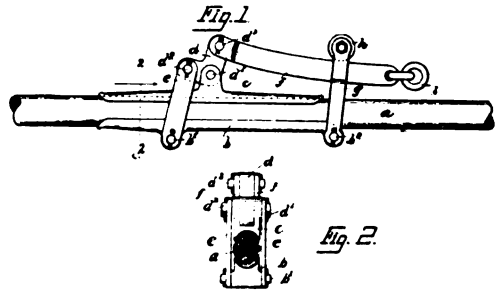


In the circuit shown relays r and r^4 are the customary supervisory relays, adapted to be actuated according to the position of the subscriber's apparatus. Relays r^2 and r^3 are the additional relays of high resistance which are normally energized owing to being in circuit with batteries B and B^2 in series with retardation coils 12 and 17, thus opening the circuits in which are included the supervisory lamps S^2 and S^3. When connection is made with the line current flows through the cut off relay R^2, thus deënergizing the relays r^2 and r^3 and allowing the respective armatures to drop away, and make connection with the contact points provided, thus closing the supervisory circuits.

"COME ALONG" FOR WIRE AND CABLE.

D. H. Garber, Indianapolis, Ind., patent 864,530, August 27, 1907.

This grip or pulling device comprises a lower jaw or shoe b, an upper jaw c, a bell crank lever d pivoted at d^1 to c as its



fulcrum and at d^2, a link e, a draw bar f, a link g and an antifriction roller h.

In application the cable a is slipped between the jaws b and c and a tension applied to the pulling rope attached to the ring i. The power is thus applied through the draw bar f and the shoe c drawn in the direction of the arrow; the jaw b is held against the cable and the link e is inclined forward as shown, thus decreasing the space until the cable is gripped so the shoe c cannot readily slide further forward on the cable, when the bell crank lever multiplies greatly the gripping or clamping pressure of the shoes upon the cable to such a degree that any amount of pulling power may be applied without causing the cable to slip through the grip.

The surfaces of the jaws of the clamping portion of the invention are of ample length and form partially encircling the cable so that when they are compressed in gripping the cable, preparatory to giving it a pull, no injury is done to the structure of the cable and is so arranged that the strain coming upon the draw bar from the pulling power is so distributed to the clamping device that the cable is not bent or buckled in the process of pulling out of the conduit. The device can be adjusted practically for several different sizes of cables by substituting links connecting between the shoes or jaws and by the use of suitably shaped interchangeable jaws, guy wires or ropes may be pulled or stretched with equal facility.

GUY ANCHOR.

L. N. Stewart, Agency, Missouri patent 864,391; August 27, 1907.

A frame of wedge shape attached to the guy strand retaining bar has mounted upon it two arms provided with blades extending outwardly at right angles at the lower end.

In the practical use of the guy anchor, the hole in the ground is first prepared of a diameter to permit the blades (which are preferably semicircular) to be inserted downwardly within the hole, when the blades are at the inner limit of their swinging movement. Then the bar retaining nut is screwed down on the stem by means of a suitable wrench or other tool, which results in drawing the wedge upwardly between the blades and their arms and results also in the outwardly swinging movement of the blades so as to cause them to dig firmly into the ground and hold the entire guy anchor in place without any liability of slipping when the strain of the line is applied.

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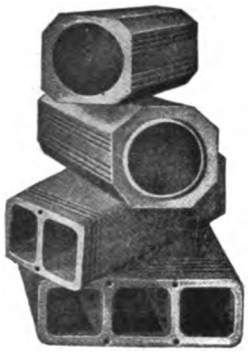

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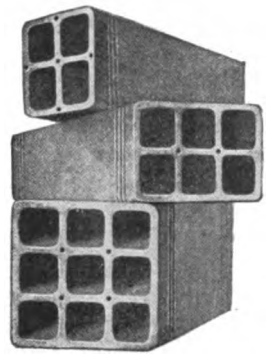
CLAY CONDUIT



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This cleaner is absolutely flexible and consequently will go around bends. It is pulled through the ducts after laying and removes all dirt, cement and any jagged edges that would injure the lead sheath. Ample room between the leather washers for dirt prevents choking. New washers easily applied at any time.

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With the Manufacturers

THE MANUFACTURE OF CONCRETE POLES AS A COMMERCIAL ENTERPRISE.

PATENTS on a method of constructing reinforced concrete poles have been granted to W. M. Bailey, of Richmond, Ind. Mr. Bailey has made an extensive study of the subject before developing the poles which form the basis of his patent, and is able to give much interesting information concerning the results of tests and suggestions for the practical utilization of such poles by telephone companies.

He states that smaller poles, up to and including thirty-five feet in height, are molded lying on the ground. Forms are laid with the butt near the hole and the reinforcement placed. Four reinforcing rods are placed within three-quarters of an inch of the surface of the cement at the respective corners, and then bound together by a spiral wire encircling the four rods from top to bottom. This not only serves to tie the rods together, but prevents danger of the cement shearing off, as the rods have a tendency to spring outwards when the pole is subjected to a lateral strain. Another important function performed by the spiral binding wire is that it ties the concrete together and increases the flexibility of the entire body. After the reinforcement is in place the concrete is poured in, and allowed to remain three to seven days, according to the weather. The forms are then removed, so that they can be used again and the pole is left to season. This process requires about three or four weeks and the poles are then ready to be set and used.

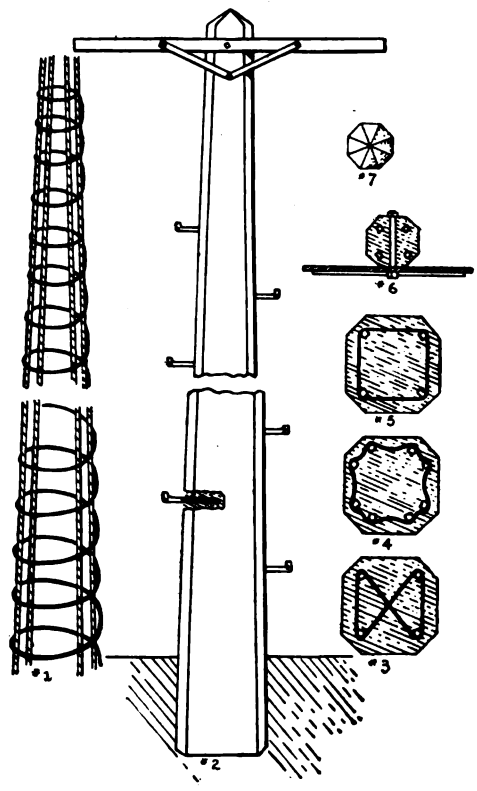

Fig. 1. Details of construction.

All poles should be built on the ground upright in the hole or in position to be readily set up, thus saving the cost of hauling or unnecessary handling, as this would increase the cost. Poles forty feet in length and larger should be built standing, as this is the most economical method. First the hole is dug and then the form is set in place directly over it, and lined up straight in a vertical position. It is temporarily guyed so as to hold its position. The spiral binding wires are then put in place and the rods drawn up on the inside of the form and set. After the reinforcement has been properly secured the side of the form that was left out to receive the steel work is put in place and the bands or ties around the outside secured. The equipment is then ready to receive the concrete.

There are several methods of placing this material. One is by using a large bucket with pulleys and a horse. With this method a fifty-foot pole can be filled in about two hours, including the mixing of the concrete. A more economical plan, according to Mr. Bailey, is to have a wagon equipped for the purpose with a gasoline engine, concrete mixer and grain elevator. With this equipment the material can be placed as rapidly as it can be mixed.

As will be seen from the illustrations, the poles are square with the corners beveled off two or three inches, so that the top of the pole is octagonal in shape. This not only gives it a handsome appearance, but leaves the corners substantial, and avoids a sharp edge that would be liable to chip off.

A line of poles constructed across Whitewater River at Richmond, Ind., is shown in Fig. 2. These poles are from forty to sixty feet in length and were built where used, in a vertical position. It is needless to say that this piece of work is permanent.

In Fig. 3 is shown a pole in detail two years old which has been subject to all kinds of strain.

Illustration No. 1, Figs. 1, 2, 3, 4, 5 and 6, gives the detail construction of pole and reinforcement, as follows: No. 1 shows the four "electro carbon" rods as they are placed in the cement body, with the spiral binding wires pulled in place. No. 2 shows a general view and the shape of the cement body as finished. Steps and other bolts and holes are very easily made while the concrete is plastic. Nos. 3, 4 and 5 show cross sections of pole with the three different methods of binding; also two different methods of reinforcing. The scheme represented in No. 4 is only intended for extremely heavy constructions. No. 6 gives a detailed idea of the manner of securing cross arms. A bolt or rod is placed in the form and removed within 24 hours after the concrete has been placed. This leaves a smooth clean hole through which the bolt that is intended to hold the cross arm can be placed, and the arm securely bolted on. No. 7 represents the top, or roof of the pole. This is easily put on after the pole is finished, but is not necessary except for appearance.

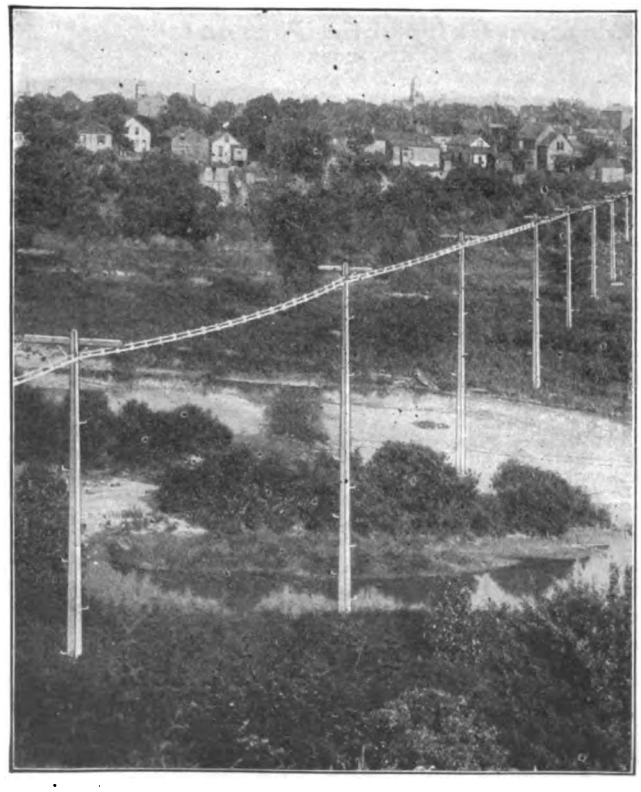

Fig. 2. Telephone cable on concrete poles at Richmond, Ind.

The inventor of these poles claims that by his tests he has demonstrated that concrete poles will not only meet, but far surpass all requirements and claims established for cedar. When the reinforcement of twisted rods and spiral binding wires are properly distributed in the column of cement, the poles are not only substantial and durable, but remarkable elasticity is displayed. For instance, Mr. Bailey has found that a pole thirty feet in length will permit

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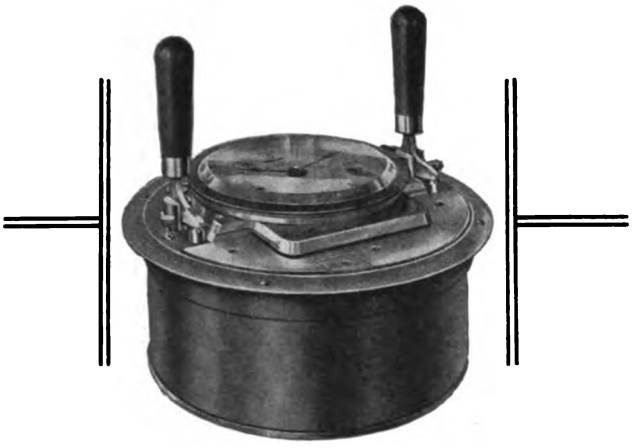
Is nowhere so apparent as in considering the difference in toll receipts where the messages are timed by the clock and pencil method and where the operator is equipped with



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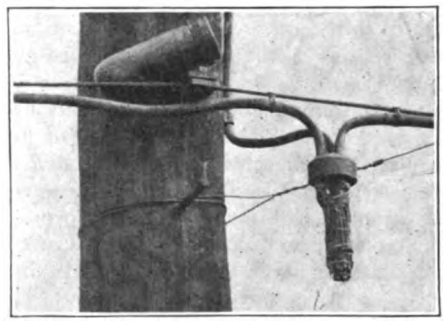

MAKING TESTS IN TELEPHONE CABLES

WHERE HARGIS JOINTS ARE USED

Take your pair of spanners, unscrew the pot from the ring, unlace the pairs and spread them out like a fan. You can then test any of the pairs with greater ease than you can test pairs on the outside layer of a Horizontal Wiped Joint. When test or repair is finished, all that you have to do is to screw the pot on to the ring and tighten with a pair of spanners, and you have a perfect moisture-proof joint. It is not necessary to drag the cable platform, block and tackle, below torch, etc., from one joint to another.

The expense of a groundman can be eliminated when looking for trouble or making tests when Hargis Joints are used. These are only a few reasons which demonstrate the advantages of the Hargis Cable Splicing Joint.

If you are considering new cable construction or wish to change your Horizontal Wiped Joints to Hargis Joints, on account of their convenience, write us to-day. You will save time and money. You will improve your cable construction.

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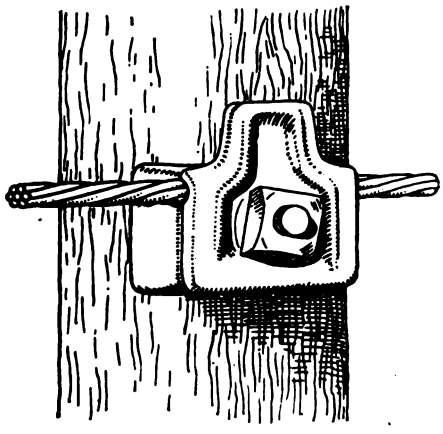

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On "Schaper" Non-Breakable Galvanized Messenger Hangers

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Easily, Quickly and Safely Installed at Low Initial Cost.

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The greatest dry battery of the age—there's no question about its strength, its efficiency or its lasting power.

If you have not been satisfied with your battery service—get the "1900"—it satisfies.

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With the Manufacturers

a deflection of thirty inches before the cement cracks. To obtain the above result would require about one-third greater horizontal strain at the top than would be sufficient to destroy a cedar pole of the same dimensions. Even the cracking of the cement is said not to seriously impair the strength of the pole, as after this takes place the reinforcement becomes active and takes the entire strain. As the special rods are guaranteed to withstand a breaking strain of fifty thousand pounds per square inch, it is an easy matter to understand why this class of construction has, when erected, two or three times the strength of cedar.

The following are a few of the points which telephone men are considering as a result of the recent demonstrations of these poles which have been made:

The depreciation fund may be relieved and can be spent for other improvements or go to pay dividends. It is said that underground construction is like diamonds. It really increases instead of decreases in value. It is possible that this can also be said of concrete poles, as it is an undisputed fact that concrete improves with age.

These poles are stronger than wooden poles and less liable to flaws and are not subject to decay. Therefore, the danger of valuable property being destroyed by wind, sleet and fire is materially reduced, if not wholly eliminated.

One of the important points in favor of permanent cement pole construction is that it dispenses with the necessity of replacing poles. It is well known that in placing a wooden pole the cost of the pole is a small item compared to the expense of labor necessary to make the change.

The cost of painting necessary in cities to beautify and preserve poles is likely to be eliminated.

The concrete presents a more pleasing appearance and is therefore less objectionable to city officials and the general public.

Self-supporting poles can be constructed to take care of any and all strains at places where it is impossible to secure anchorage.

The cost of dressing, framing, roofing, boring and stepping may be dispensed with.

Mr. Bailey's patents have been assigned to The American Concrete Pole Company of Richmond, Ind., whose intentions are not only to construct concrete poles under contract, but to sell the right to construct to other companies and users on a small royalty basis, or to sell the right to certain territory. The officers of the American Concrete Pole Company are A. C. Lindemuth, Richmond, Ind., president; W. M. Bailey, Richmond, Ind., vice-president and general manager; L. E. Browne, Richmond, Ind., secretary and treasurer. The board of directors is made up as follows: James S. Brailey, Jr., Toledo, O.; Col. W. P. Orr, Piqua, O.; L. M. Flesh, Piqua, O.; S. K. Statler, Piqua, O.; J. L. Boyer, Piqua, O.; John M. Lontz, Edwin H. Cates, Perry J. Freeman, Richmond, Ind.

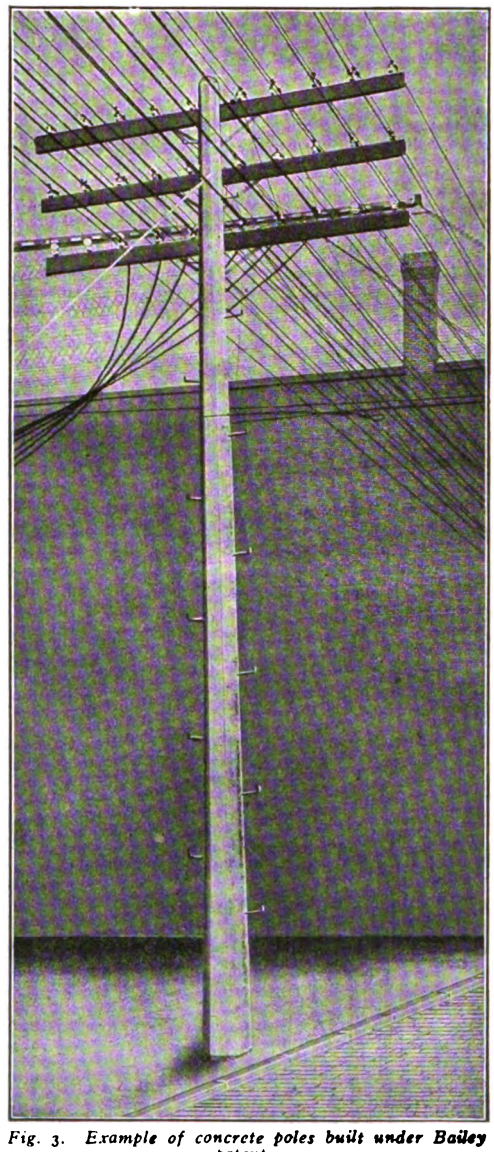

Fig. 3. Example of concrete poles built under Bailey patents.

Doubleday-Hill Electric Company has opened at Charlotte, N. C., a new warehouse in order that it may take care of its Southern trade with the utmost promptness. It will carry in stock a comprehensive line of the best grades of material such as "O. K." weather proof wire, "Parac" rubber covered wire, and the many other specialties which it lists in its catalogue.

Mountain State Electrical Company, Wheeling, West Va., is prepared to give out information concerning the practical results which are obtained by the use of the Hall cable construction specialties. Among these are included the well known Hall terminals for various types of cable distribution and also the apparatus necessary for the "Hall method" of dead-ending cable messenger wires. This is a plan for transferring stresses to the ground instead of permitting them to be borne entirely by a pole, and is fully explained in a book which the company will furnish to interested persons.

Bristol Company, Waterbury, Conn., has recently opened a district office at No. 753 Monadnock Block, Chicago. H. P. Dennis is in charge as Western manager of the company's business. Mr. Dennis has been promoted to his present position after several years of successful work with the Bristol Company, one of his important positions having been that of representative at the St. Louis Exposition. He is vigorously pushing the sale of the recording electrical measuring instruments manufactured by the company, which include the well-known Bristol recording voltmeters and ammeters. The use of these instruments gives a permanent automatic record which is especially valuable to companies making detailed studies of storage batteries records, with the object of reducing maintenance expense on this valuable class of equipment.

James H. Edwards, Decatur, Ala., is making plans to enlarge his plant for the manufacture of telephone brackets to twice its present capacity. Although his business has been only a few years established, he reports that customers are so well satisfied that it is growing very rapidly.

Wire and Telephone Company of America, Rome, N. Y., in a new booklet states that its new hand telephone, the Easophone, has been successful in creating a demand for telephones where they have not hitherto been used to the extent conditions justified. This success with the new instrument is attributed to the fact that it combines great convenience for handling with substantial construction and talking qualities which conform to a high standard. The new booklet will be especially interesting both to the exchange manager and the contract agent, as it gives many interesting ideas suggesting methods of obtaining new business by the introduction of this convenient type of equipment.

Schaper Construction Material Company, 135 Liberty St., New York City, issues a catalogue in which are listed a full line of specialties for the construction of aerial telephone lines, both open wire and cable.

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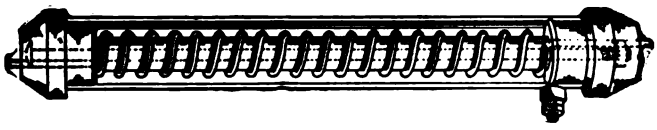
"Development"

Another Quotation

"Great expenditures have been made in the development of protective apparatus, not on account of the intrinsic commercial value of the arrester business, but because of the broader scope it gives to the electrical industries."

"In the development of lightning arresters no form is more scientifically correct than the multi-gap-reactance line arrester."

SKY ROCKET ARRESTERS



represent the highest point in development of the multi-gap-reactance line arrester.

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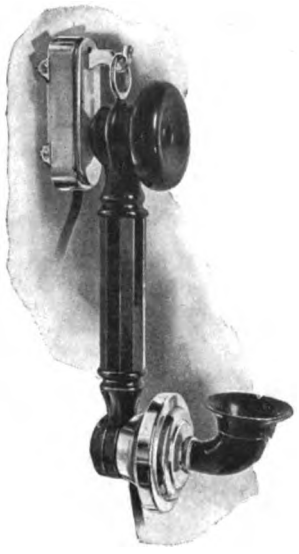
See who has it now. What?

THE .. Easophones Smile!

The WIRE & TELEPHONE COMPANY of AMERICA ROME, N.Y.

Why, every magneto exchange manager, also the farmer, and when he smiles the world smiles with him.



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Yes, we have the wall as well as the desk type.

Popular? Well, ask either the manager or subscribers. Their record is proof positive that the Easophone

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It will prevent the checking and warping of wood, and will expel dampness from wood and make it waterproof.

It contains no free acids injurious to the wood fibre, but on the contrary it will make wood tough, hard and give it a greater resistance against strain and other mechanical action.

It is ready for use and has the advantage of remaining in this condition for years, therefore it may be kept in stock, without waste.

It is applied with a brush, like paint, or by immersion of the timber, no skilled labor being necessary for its application.

It will increase the life of telephone poles by twenty years

Carbolineum Wood Preserving Company

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PROBLEM:

Jones owns an exchange into which a party line enters. One subscriber, "A," wishes to call central without the knowledge of his neighbors. Jones would like to accommodate him, but objects to the expense necessary for push buttons, commutators and rewiring at the subscribers' stations and switchboard. How can Jones avoid it?

SOLUTION:

Give "A" a LONG DISTANCE Bridging Telephone. It calls central secretly without additional expense or trouble for rewiring, push buttons, commutators, etc. No change in other subscribers' stations or at central is required; no extra charge for the 'phone. Ask for Bulletin "B."

LONG DISTANCE

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SOUTH BEND, INDIANA

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News From the Front

NEW COMPANIES.

ADDISON, ALA.—At a recent meeting of the citizens of Addison, Double Springs and other towns, an Independent telephone company, to be known as the Winston County Telephone Company, was organized, and articles of incorporation filed. The authorized capital stock is placed at $5,000, of which $1,250 has already been paid up. It is the new company's intention to build a line from Addison to Double Spring, thence to Haleysville, and ultimately to Lynn and Jasper. The officers are Dr. C. A. Olivett, of Addison, president; Z. McVay, Double Springs, vice-president.

THOMPSON, IA.—Articles of incorporation have been filed by the King Mutual Telephone Company, which intends to establish its principal place of business at Thompson, with branch offices throughout the surrounding country. The capital stock is given at $2,520, and the following officers and directors have been named: F. J. Brooker, president; A. B. Mhyr, vice-president; H. H. Mattison, secretary and treasurer; F. J. Raddle, Casper Meyers, Adam Bell, R. T. Alego and William Wetter, directors.

EDMOND, OKLA.—The Edmond Southwestern Telephone Company, of Edmond, has been incorporated with a capital stock of $1,800. Among the incorporators are F. M. Pettigrew, W. R. Corbett, J. B. Card, E. E. Madill and G. B. Walters.

LOGAN, OKLA.—The Logan Telephone Company is the name of the newly organized Independent telephone company which has filed articles of incorporation. It has an authorized capital stock of $5,000, and the following directors have been elected: Frank Wentworth, J. Thompson and Sam Smith, all of Logan.

LEBANON, TENN.—On account of the failure of the Cumberland Telephone & Telegraph (Bell) Company to give the citizens of Lebanon the service it promised them, action has been taken which has resulted in the organization of a new company to be known as the Wilson County Independent Home Exchange. Subscriptions are being taken, and as soon as a sufficient amount of stock has been subscribed an exchange is to be established, and connections effected with some other Independent companies.

LEXINGTON, TENN.—Among the newly organized Independent telephone companies is the Broadway Home Telephone Company, which is to be capitalized at $5,000. An exchange is to be installed at Lexington, and a line built to Juno, where connections will be made with other Independent lines. The officers of the company are: President, Jere Hawthorne; secretary, F. M. Evans; treasurer, A. H. Insco; trustees, W. A. Webb, W. H. Rhodes and B. C. Young.

RICE LAKE, WIS.—The Rice Lake & Northwestern Telephone Company, of Rice Lake, which has an authorized capital stock of $10,000, has been incorporated. Among those interested in the new enterprise are W. H. Bundy, L. S. Everts and J. E. Horsman.

SUPERIOR, WIS.—Articles of incorporation have been filed by the Superior Rural Telephone Company, whose intention it is to install a telephone system in this city. The capital stock is placed at $2,500, and the incorporators are George H. Selden, Riley S. Hartley and Henry Ward.

ENCAMPMENT, WYO.—Owing to the very unsatisfactory nature of the service being rendered by the Rocky Mountain (Bell) Telephone Company, and its disinclination to improve it, the business men of this city have formed a new company, which is to install a strictly up-to-date system. Among those actively represented in the new project is Hon. W. C. Henry.

FRANCHISES.

MOLINE, ILL.—The Union Electric Telephone & Telegraph Company, of this city, expects to apply for franchises at East Moline and Silvis, and is also to apply for additional privileges at Moline. If these franchises are granted the company expects to build lines to East Moline and Silvis, and to make many extensions and improvements in its plant at Moline.

WOONSOCKET, R. I.—Application has been made by the Shaver Telephone Company for a franchise at this city to operate in competition with the Providence (Bell) Telephone Company.

DENISON, TEX.—The Texas Company's telephone and telegraph line has been granted a franchise, and expects to construct its lines along those of the interurban railway throughout the city.

FINANCIAL.

MT. PULASKI, ILL.—The capital stock of the Independent Farmers' Telephone Company has been increased from $8,000 to $25,000.

WORTH, MO.—The Worth Mutual Telephone Company has increased its capital stock from $10,000 to $15,000.

PHILADELPHIA, PA.—The Keystone Telephone Company's report for the year ending June 30th shows: Gross earnings aggregated, $995,752, against $174,910, while expenses involved $518,691, $64,765 increase over the preceding year, leaving net earnings of $477,061, or $110,145 more than those of the year ending June 30th, 1906. Charges were represented by the sum of $268,975, or $57,983 more than those of the previous year, leaving a surplus of $208,086, an increase of $52,162 over the previous year. The reserve fund contributions amounted to $100,346, or $22,908 more than for the year preceding, leaving a final surplus of $107,740, or $29,254 more than at the close of the previous year. It is estimated that 6 per cent. on its preferred stock was earned by the company during the fiscal year.

GLENWOOD, WIS.—The capital stock of the West Wisconsin Telephone Company, of which W. H. Park is president and O. S. Fallensbee is secretary, has been increased from $7,000 to $12,000.

ELECTIONS.

TROY, N. Y.—The following officers and directors have been elected by the Commercial Union Telephone Company: President, James H. Caldwell; first vice president, William Connors; second vice president, Irving H. Griswold; secretary, W. Levis Burk; treasurer, Peter McCarthy; assistant treasurer, William C. Colburn; directors, J. J. Hartigan, W. L. Burk, William Connors, C. V. Collins, Troy; T. M. Brush, Elyria, O.; C. W. Cool, Glens Falls; Edward F. Murray, James H. Caldwell, Peter McCarthy, William C. Geer, William D. Mahony, Troy; E. T. Brackett, Saratoga Springs; B. G. Higley, Sandy Hill; I. H. Griswold, Albany, and A. MacArthur, Troy.

FREDERICKSBURG, VA.—At its regular meeting recently the stockholders of the Toluca & Fredericksburg Telephone Company elected the following officers and directors: Hugh Adie, president; C. A. Bryan, secretary; E. S. Moore, business manager; directors, Thomas J. Waller, C. A. Bryan, R. A. Moncure, Hugh Adie, E. M. Snead and A. J. Pyke.

DURAND, WIS.—The officers of the Inter-County Telephone Company are: Phil Fox, president; Ward Lobdell, vice president; R. E. Walters, secretary; C. R. Heike, treasurer.

COMBINATIONS.

COLUMBUS, IND.—The Citizens' Telephone Company, of this city, has become the owner of the Grammer Telephone Exchange, together with the lines in the Burnsville neighborhood, the consideration being $5,000. Some time ago the Independent exchange at Burnsville was abolished, and the business was directed to the Grammer Exchange. The present transfer includes both the telephones running into the Grammer Exchange and the lines which were formerly served from Burnsville. The new owners, which recently bought the Elizabethtown Exchange, expect to make many improvements in the system.

CASSOPOLIS, MICH.—The Cass County Home Telephone Company, of Dowagiac, Mich., has acquired the Cassopolis Telephone Company's property, which includes exchanges at Cassopolis and Marcellus, the consideration being $20,000.

FREDERICKSBURG, VA.—Connections have been effected by the Upper Rappahannock Telephone Company with the Tidewater Telephone Company, which will greatly extend its field of operations.

CAMERON, W. VA.—The National Telephone Company has formed arrangements with the Cameron Telephone Company whereby the latter company is given connections with Wheeling and all other points on the National line.

MISCELLANEOUS.

MONTGOMERY, ALA.—Many telephone wires were put out of commission by a recent tornado which struck this city.

BENTON, ARK.—The capital stock of the Benton Telephone Company, recently incorporated, is $2,000, instead of $3,000, and the officers are: J. M. Caldwell, president; W. L. Caldwell, vice-president and general manager; J. F. Lee, secretary and treasurer.

HOPE, IND.—Plans are under way for the organization of a stock company, whose purpose it is to take over the control of the property of the Hope Independent Telephone Company, the value of which is placed at $20,000. The proposition includes the disposal of the stock at $50 a share, four hundred shares to be issued, and the amount of stock to each stockholder to be limited to four shares. It is expected, if the deal goes through, that a large amount of money will be expended in the improvement and extension of the system.

SKOWHEGAN, ME.—The central office apparatus of the Farmers' Tele-

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

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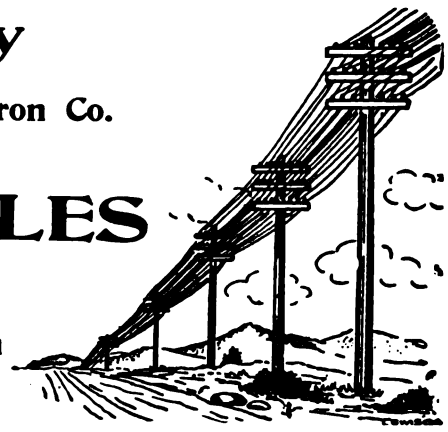
Yards from
Maine to Washington



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All Heart, Special Sizes, Plain Painted or Creosoted. Large Stocks, Quick Shipments.

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Guaranteed to give a loud, clear tone and DON'T fry, sizzle, pack or go dead.

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WHITE CEDAR POLES

WE ALSO HANDLE CHESTNUT AND WESTERN RED CEDAR.

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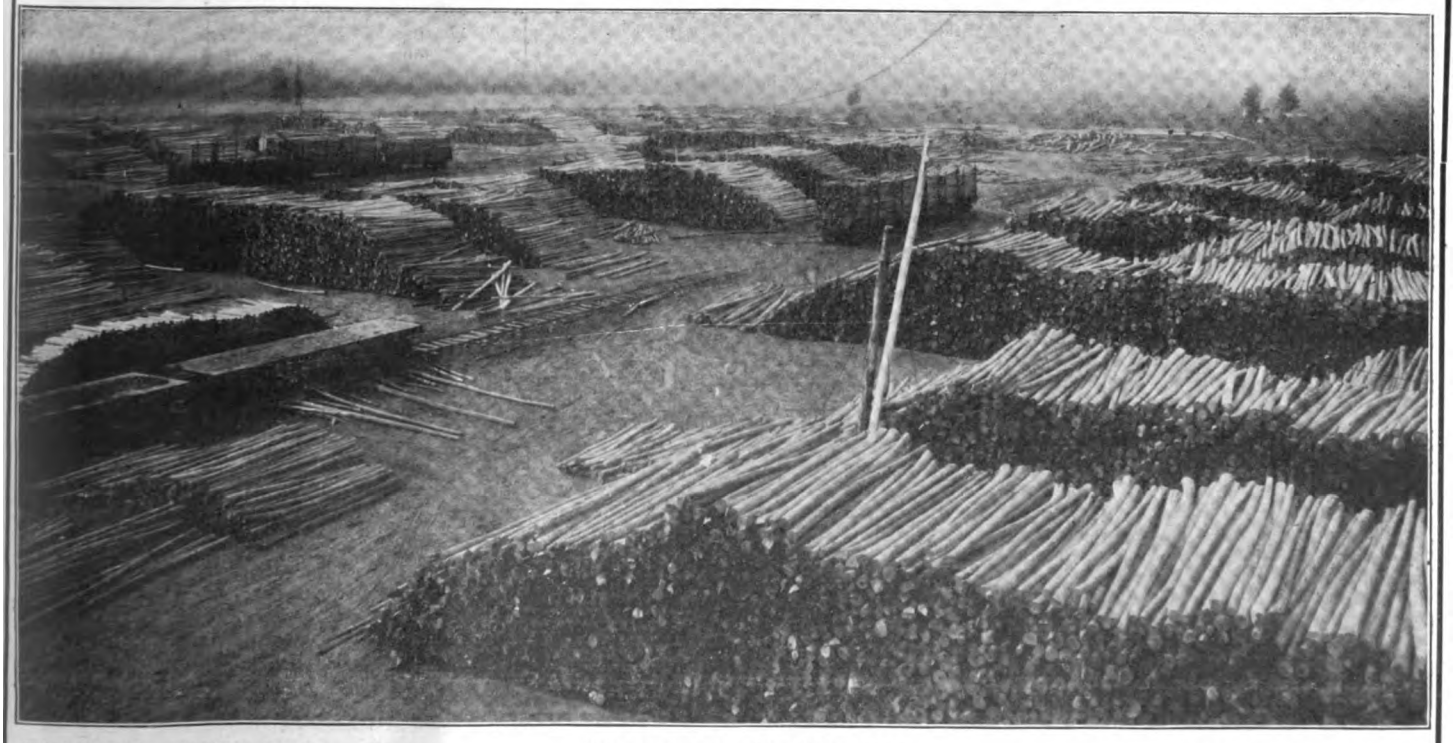
ATLANTA
WINNIPEG



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News Notes of Progress

DeArmond, of Hamilton, are said to have secured an option on the Harrison Telephone Company, of Harrison, a suburb of Cincinnati. The company has a large number of telephones, and reaches into two Indiana counties.

TWISP, WASH.—The Government is considering the advisability of establishing, with the co-operation of the citizens, telephonic communication in the towns of Twisp, Conconully, Barrow, Winthrop and other places. It proposes to furnish all the material if the citizens along the route will see to it that the work of setting poles, etc., is done. As the service which is being rendered by the Pacific States (Bell) Telephone Company is far from being satisfactory, this proposed plan is looked upon with considerable favor by the citizens of the above named cities.

PERSONAL.

JAMES A. COLLINS, formerly manager of the Taunton exchange of the Southern Massachusetts Telephone Company, has been promoted to the management of the exchange system of the same company at Brockton, Mass.

A. G. CONNOLLY, formerly manager of the Bethlehem district of the Pennsylvania Telephone Company, which comprises the Bethlehem, Coopersburg, Hellertown and Nazareth exchanges, has recently resigned to accept the position of general manager of the Slate Belt Telephone and Telegraph Company. The territory of the latter company covers three-fourths of Northampton and part of Monroe counties in Pennsylvania, with five exchanges in operation. Mr. Connolly will take up the important work of the renovation of the entire plant, with the object of equipping it to give the very highest grade of service.

WALTER A. CRUM, manager of the Merchants' Mutual Telephone Company of Michigan City, Ind., has recently tendered his resignation. Mr. Crum will devote his entire time to electrical contracting and construction.

M. J. DOYLE, formerly manager of the Union Telephone Company at Sharon, Pa., has been appointed manager of that company's exchange system at New Castle, Pa.

R. C. LICHTY, of Sunnyside, Washington, was elected secretary of the Yakima Valley Telephone Company at a recent meeting of the board of managers. Mr. Lichty will occupy the office of Mr. Irish, recently resigned, and will assume his new duties immediately.

PAUL D. MANLOVE, formerly superintendent of the system of the Galena Home Telephone Company, Galena, Kansas, has accepted the position of general manager of the Sonora Telephone Company, Hermosillo, Sonora, Old Mexico. Mr. Manlove will enter upon his new duties immediately.

Extensions and Improvements

KILBOURNE, ILL.—The exchange of the Kilbourne Telephone Company, which was recently destroyed by fire, is to be rebuilt, and a new system installed at as early a date as possible.

LOGANSPORT, IND.—The local telephone company at this city is considering the advisability of installing an automatic exchange.

SERGEANT BLUFF, IA.—The Sergeant Bluff Telephone Company, which was incorporated some little time ago with a capital stock of $20,000 by A. J. Westfall, George S. Parker, R. D. Westfall, William Milchrist and J. A. Duncan, is to install an exchange at Sergeant Bluff, and to build lines and install exchanges throughout the State of Iowa.

SELLERSBURG, KY.—Telephones have been installed along the line of the Indianapolis and Louisville Traction Company between Sellersburg and Scottsburg, and the work is to be still further extended in the near future.

PLAIN DEALING, LA.—A new telephone system in this city is being constructed by H. H. Montgomery.

RAZORVILLE, ME.—The lines of the Washington Telephone Company are being extended in and about Razorville.

HARTLAND, MINN.—Plans are being considered by the Hartland Telephone Company for the extension of its line from its present terminus, northwest of Freeborn, into Matawan, and from there west, where connections will be made with the Wells telephone line.

DE WITT, MO.—The De Witt Telephone Exchange, owing to the recent improvements which have been made, now has a strictly up-to-date system.

STANFORD, MONT.—Changes in its system at this city, which will tend to greatly improve the service, are to be made by the Lewistown Telephone Company.

LOGAN, NEB.—Plans are being considered by the Logan German Telephone Company for the establishment of an exchange at this city.

SCHENEVUS, N. Y.—A trunk line from Oneonta to Schenevus, which will take in Maryland Village, Worcester, Milford, Colliers and other points, is being erected by the Schenevus-Worcester Home Telephone Company.

OIL CITY, PA.—Among the many extensions being made in its system by the Petroleum Telephone Company is the construction of lines in Bradleytown, Cooperstown and Wallaceville, with Cooperstown as the radiating point. A switchboard is to be installed at the latter city, and additional lines built into the surrounding country. Address W. S. Paca, manager.

PHILADELPHIA, PA.—New lines between Trenton, Philadelphia and Newtown have been erected by the Keystone Telephone Company, and it is now prepared to give Doylestown and Bucks County towns first-class service.

WINDBER, PA.—On account of the congested condition of the lines at Johnstown, through which town messages for Somerset County points must pass, the Windber Telephone Company has decided to build a line to Seanor. This will afford closer connections with the county seat, and at the same time materially improve the service to Johnstown.

KNOXVILLE, TENN.—Several thousand feet of cable are to be used by the Bristol Telephone Company in the extension of its system at this city.

COMANCHE, TEX.—Many improvements have been made in the telephone system owned by B. Dingler in this city, and he is now considering the construction of a line from Gap to Blanket, and also a line to May.

CUERO, TEX.—Arrangements are being made by Charles R. Steinemann, of Stratton, for the erection of a line from that place to Cuero. It is quite probable that a line to Terryville will also be constructed.

DENTON, TEX.—Many extensions in its system are being made by the Home Telephone Company. This has been made necessary by the increased demand for service brought about by the increase in rates by the Southwestern Telephone & Telegraph (Bell) Company.

CHEHALIS, WASH.—It is the intention of the Northwestern Long Distance Telephone Company, if the franchise for which it applied is granted, to have its system installed and in operation inside of ninety days.

CHESAW, WASH.—A new Independent line is being constructed by the citizens of this city, which is to connect with the railroad station four miles north of Chesaw.

SPOKANE, WASH.—It is stated that the Forest Service of the United States Department of Agriculture will expend a very large sum of money in improving and extending its telephone service this year. Two thousand miles of wire are being strung on the reserves in the northwest, a line is being built on the Washington east reserve on Lake Chelan from Stehekin, a distance of sixty miles around the lake; a line from Kooskia to Syringa, 125 miles of line on the Bear River reserve in southern Washington, and many other extensions for the protection of the forests against fires.

SPOKANE, WASH.—A new line to St. Maries, which will give service to Mt. Hope and Rockford, is being erected by the Interstate Telephone Company. Later lines are to be built from Rockford throughout the Palouse country.

CHARLESTON, W. VA.—The Charleston Home Telephone Company, which also has exchanges at Cabin Creek, Clendennin and Montgomery, expects to use over 60,000 feet of cable in the extension of its lines in this city. The additional lines are made necessary owing to the company's greatly increased business. Among the other improvements in its system is the erection of a direct copper circuit to Parkersburg, which gives service to Wheeling, Pittsburg, Clarksburg, Fairmont, Morgantown, Mannington, Kingwood, Elkins, Buckhannon, Weston, Phulippi, Sutton, Glenville, Spencer, St. Marys, Marietta, Sisterville, New Martinsville, Moundsville, Grafton and other places.

DURAND, WIS.—The recently organized Inter County Telephone Company is soon to commence the construction of lines into Pepin, Buffalo and Dunn counties. It has also obtained and will operate the lines outside of the city limits formerly owned by the Light and Power Company.

MELITA, MAN., CAN.—A new line connecting Napinka with Melita has just been erected by the Melita-Arthur Telephone Company.

TORREON, MEX.—The Woessner Telephone System, owned and operated by John Woessner, is soon to be connected with the Durango Telephone Company, owned by W. C. Bishop, the concession for constructing this line having been granted some time ago.

UNDERGROUND.

LANSING, MICH.—Considerable conduit work is to be done by the Citizens' Telephone Company in Lansing.

HOUSTON, TEXAS.—Considerable conduit work is to be done by the Automatic Telephone Company during the installation of its system in this city.

WINNIPEG, MAN., CAN.—The city council has voted $20,000 toward the construction of one duct in the conduit to be built by the Manitoba Government for the provincial telephone system. Address F. E. Cambridge, city electrician, or Orrin F. French, superintendent of telephone construction for Manitoba, both of Winnipeg, Manitoba.

WINNIPEG, MAN., CAN.—A sub-committee of the city council has voted in favor of presenting a by-law to the ratepayers to raise $200,000 for the construction of conduits for the purpose of placing all wires in the city underground. F. E. Cambridge, city electrician.

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The American Telephone Journal

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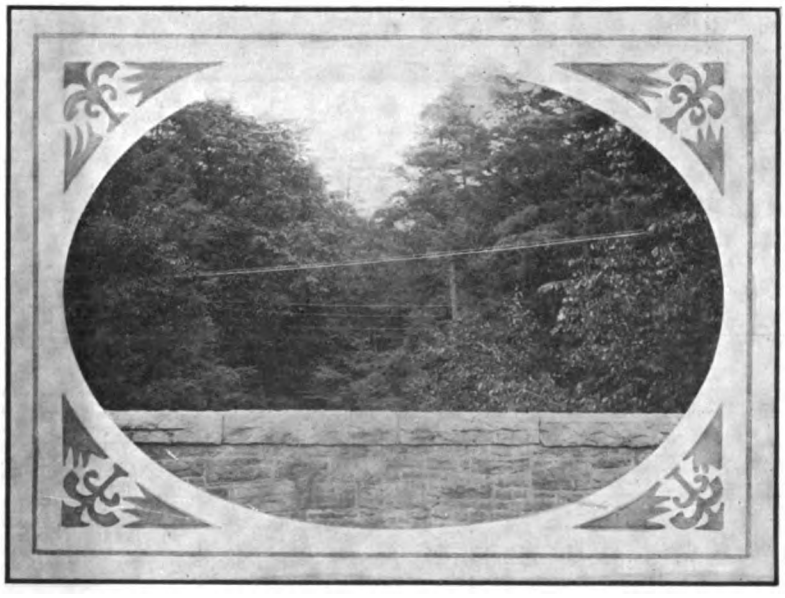
VOLUME XVI. SATURDAY, SEPTEMBER 28, 1907. NUMBER 13.

A New Triumph for Independent Telephony—The Cornell Branch Exchange*

By Charles Wilkins.

DAY and night services are given through the Independent branch exchange at Cornell University, so that there is never a time when telephone connections cannot be obtained from the more important offices. The buildings which are to receive night service have been designated by the officials and the lines which were chosen are connected through designated trunks at 6 o'clock every evening, so that the operator at the central office of the telephone company in the city can call without delay the desired station if it is one of the number so located that calls will be answered.

As one of the most essential things in connection with the installation of this branch exchange was that no unsightly poles or wires were to be put in positions where they would mar the beauty of the campus, plans were made for putting all wires underground on leads extending to buildings having over five telephones. Specifications covering this work were drawn up in definite form, even extending to such details as the type of cable to be used. For example, it was specified that all cables should have lead sheaths ⅛ inch in thickness, conductors No. 22, B. & S. gauge, with an insulation resistance of 500 megohms per mile and a capacity not exceeding 12 M. F. per mile, each conductor being measured against all the rest.



Telephone Cable, with Supporting Poles Concealed in Trees, Which Spans the Gorge —One of the Notable Bits of Scenery Near Cornell University.

It was further specified that throughout the entire system all workmanship should be first class and that the installation should be performed in such a way as to avoid putting obstacles in the buildings and avenues of the campus and be free from all risk of injury to persons or property. All material furnished and all work performed were to be open to the inspection and subject to the approval of the university's representatives. Construction work was done by the Century Telephone Construction Company of Buffalo, and it handled matters so smoothly that at no time did the representatives of the university find it necessary to express the slightest dissatisfaction with the way things were going on. In the outside plant the company had to dig about a mile and a half of trench. In doing this work, although it had to be completed at a definite time, it was found to be advantageous to work not over ten men in a gang in digging the trench, laying conduits, etc., as the university would not allow a very large stretch of ground to be dug up at a time. As capacity for future circuits had to be considered, cables of rather large size were used for the main runs, the figures for this class of material being 5,060 feet of 200 pair cable, 5,000 feet of 100 pair cable, 2,025 feet of 50 pair cable and 3,500 feet of 25 pair cable. In distributing wires throughout the grounds by means of these cables it was found to be the most practical and economical layout to carry the main cables to one end of the building in the conduit and run it inside to terminals in a suitable distributing box; then another cable was connected to the same terminals and carried on through the basement and into conduits at the other end which led to the next building on the campus, and so on through the grounds. All the interior wiring is concealed, except where brought out to a telephone. From the basement conduit pipes are run up through the building to the top floor. On each floor a feeder conduit is run to the main pipes which extend through the building vertically, and by means of this feeder the telephone wires are brought out to a moulding near the ceiling. In this moulding they are carried to whatever rooms should be equipped with telephones and there dropped off to the instruments. The moulding is finished to match other woodwork in the building and so affords a perfectly neat form of concealment for the wires.

The switchboard installed in Morrill Hall is the one position 150-line board which was made by the Century Telephone Construction Company, of Buffalo, N. Y., and exhibited last June at the Independent telephone convention at Chicago. This board is fully equipped with twenty trunk lines, line lamp signals controlled by relays and double supervisory lamp signals on each cord circuit. Pilot lamps are provided for each signal panel. Ringing power is obtained over a trunk from a ringing machine

*Concluded from issue of Sept. 21.

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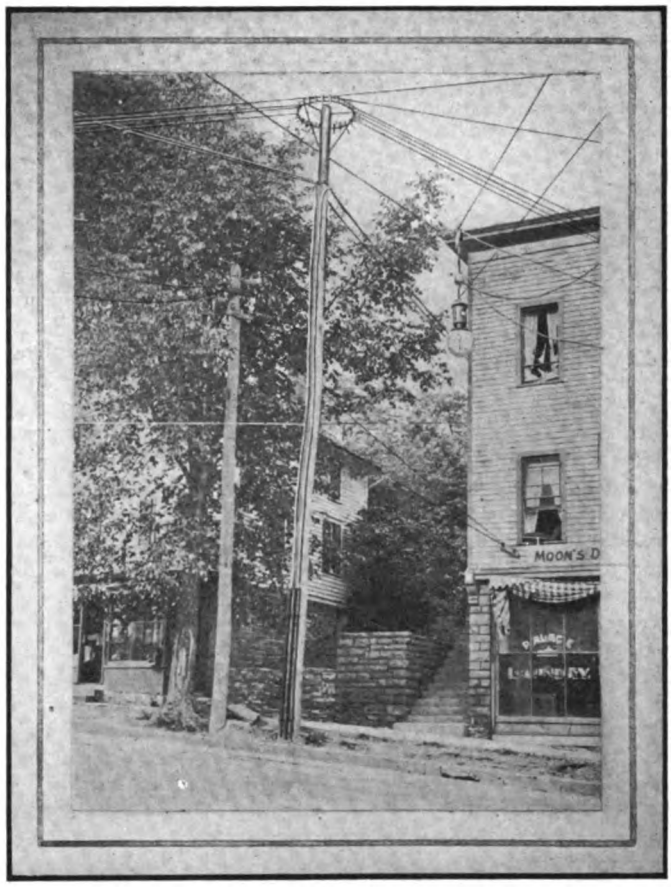
at the telephone exchange. This is carried through a key, so that in case of emergency a hand generator may be used for calling telephones in the buildings. Ordinary Century terminals having fuses and carbon lightning arresters mounted in golden oak cabinets are installed for the protection of the switchboard.

It is a notable thing that the telephone company, although the service has only been given to this branch exchange for a very few days since the opening of the university this fall, has experienced a very considerable general increase in business on account of this installation. In the first place, the toll business of the telephone company will, no doubt, be very much increased as soon as it is generally understood at outside points that it is possible to obtain direct connections with any part of the university without delay. Already a fair improvement over the amount of outward toll business transacted from the university at a corresponding time last year has been noted. In the city of Ithaca and surrounding territory the number of local subscribers has been increased by the addition of many who have occasion to talk to somebody at the university. The fact that Cornell has only the single branch exchange of the Independent company makes it necessary for other subscribers to use its lines when they wish to speak to somebody in the buildings or the campus. In this way it is responsible for a considerable number of new subscribers' stations.

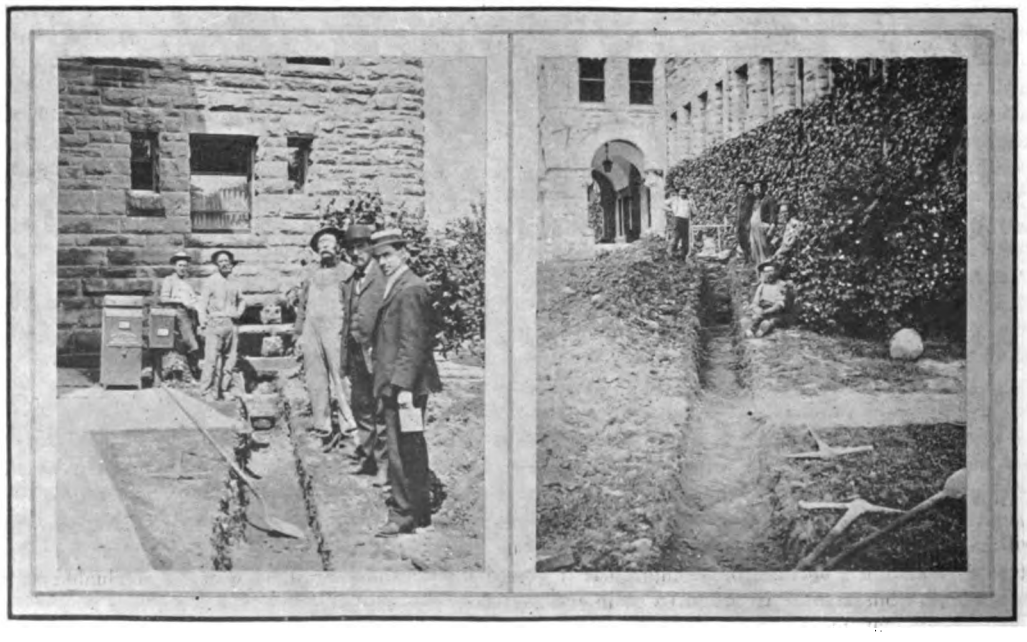


Cable from Cornell University at Point of Entrance into Ithaca Underground System.

In the matter of business arrangements for handling toll calls it was decided to install no pay stations, as every telephone could not conveniently be made a pay station, and it was just as likely that toll calls would originate at one station as another. In order, therefore, to derive the fullest measure of convenience from the branch exchange system it was arranged that the member of the faculty in charge of each building should be held responsible for the tolls originating at the telephones under his control. It is expected that this arrangement will work very satisfactorily, although, of course, it has not been proved by the actual test of time.

This entire installation shows more clearly perhaps than any could be cited the most excellent degree of efficiency in operating and high state of development which has been attained by Independent telephone companies in New York State. As has been mentioned, the contract was awarded under such circumstances that it could have been secured only on the basis of superior service; that is, the Independent company, in order to obtain the business of Cornell University, had to demonstrate that it had a greater number of subscribers in the territory with which the university would wish to communicate and that it was giving them a higher grade of service than its competitor. In addition to this the ability and the announced intention of the university authorities to make a careful scrutiny of the apparatus and methods of construction adopted, covering them from a technical standpoint, would have made it impossible to supply anything but the very highest grade of equipment and workmanship. The satisfaction which is felt by the university authorities is, under these circumstances, an indorsement of the methods of Independent telephone companies, which coming as it does from such an authoritative source, is a most conclusive evidence of superior merit.

This branch exchange system, comprising as it does the most modern approved construction and apparatus of the highest point of development and connecting with a modern, well managed local plant, which serves as a medium through which the university may reach some eighty-five thousand Independent telephones will undoubtedly prove to the university authorities, as time passes, that no mistake was made in deciding upon Independent telephone service as that which would yield the greatest returns on the amount expended and to the exclusion of all other telephone systems.



Breaking Ground at the Cornell Library. Manager R. B. Fegan, of Ithaca Tel. Co., in Foreground.

Small Section of Underground Work Running into Boardman Hall.

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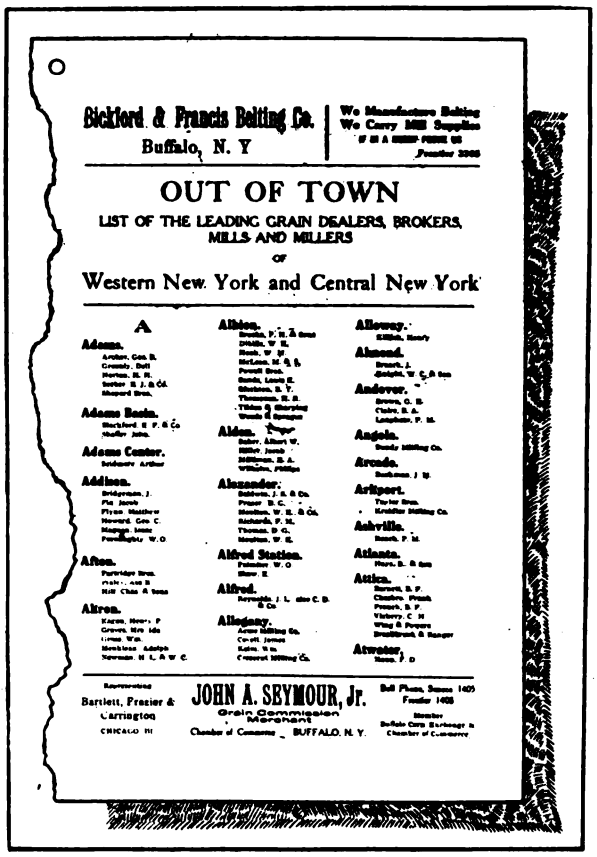
Increasing Long Distance Receipts by Special Directories—The Grain Book

By Wm. A. Wadsworth.

SPECIAL directories restricted to a single class of business are the latest means of increasing toll receipts and offer a prospect of success exceeding that attained by any of the other well-known methods of advertising this class of service. Building up the receipts for the use of their long distance lines has been the object of numerous experiments carried on by many telephone companies during the past few years. Enormous sums of money have been spent in the way of large discounts given to frequent users of toll lines. In fact, discounts have been so large that telephone men can look up all other kinds of business and be unable to find a commodity which has been so burdened with rebates as long distance telephone service when sold in advance. Undoubtedly this practice of giving discounts has proven to be of considerable value in creating the telephone habit and stimulating the use of toll lines and one need not hesitate to say that the actual amount of money represented by discounts has been greatly reduced by the enormous output of coupons to people who mislay them, so that they are burned up or lost in other ways. The day of the coupon, however, is fast disappearing, just as the night rates believed in so many quarters to be objectionable are being eliminated. This has been accomplished by the Bell companies on September 1, 1907, and these telephone companies are now making 100 cents on a dollar by their full rates for all long distance messages.

In order to increase the Independent long distance business on sound lines, however, it is necessary to look to other means. Before this can be done in the right way the telephone companies must get at the bottom of the whole affair and look at it from a subscriber's standpoint. Long distance talking is created or stimulated by the facilities furnished by the man who sells to the man who buys. Ninety-nine per cent. of this talking is between parties of allied business interests or those whose business runs along the highway marked by methods of dealing in a single class of products. For an example, a man in the grain business invariably talks most to other men in the same line. During his business hours he is doing nothing but selling grain and this means that he is thinking of grain, seeking grain customers, grain buyers and constantly talking about grain to them. Outside forces are valuable to him in such proportion only as they help him and his office force in their work. Now, why should not the telephone company furnish some outside assistance to him that will not only help him but itself also? It is worth its while to go to work on the old line of thought that if you take an interest in a man's business he is bound to be interested in yours. That is human nature.

It is this consideration which has led the Inter-Ocean Telephone and Telegraph Company of Buffalo to publish a Grain Book—a special directory of grain men for the use of grain men—to show a complete list of prospective grain buyers who can be reached by direct connections over the Inter-Ocean's long distance lines. Every grain man who has a copy is bound to refer to it if only for a new address and he will often look into it for new customers. Thus he is likely to find somebody whom he may have forgotten. The book is in this way invaluable to him and therefore it is not likely that he is going to forget who it was that assisted him. This is the precise reason why the grain book is published—to create in the minds of each man who uses it the belief that the Inter-Ocean Telephone and Telegraph Company is an ever-present aid to his business. The company believes that its user will appreciate the fact that he has received something from the telephone company that has accomplished two things. First, it brings him face to face with a possibility of increasing his business, and, second, the possibility of increasing his business through the use of the long distance lines.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Albion.
Alden.
Alexander.
Alfred Station.
Alfred.
Allegany.
Alloway.
Almond.
Andover.
Angola.
Arcade.
Arkport.
Ashville.
Atlanta.
Attica.
Atwater.
JOHN A. SEYMOUR, Jr.
Grain Commission Merchant
BUFFALO, N. Y.
Bartlett, Frazier & Carrington
CHICAGO

A Page From the Inter-Ocean "Grain Book." Separate Lists Are Made Up in the Same Book for Dealers in Buffalo and in the Surrounding Territory.

Throughout the grain book there is just enough information about the long distance service of the telephone company to become noticeable and it is of a sort that can be read at a glance. It has been made attractive enough to insure the attention of the book user, simple enough to be understood by busy men and there is sufficient information in it to be of considerable value and help. An article that contains all of the above points is kept handy, not hidden away. Experience shows that this book is laid on the desk or table or hung on the wall where it will always be accessible. It is constantly being asked for and used. Other telephone managers will find it worth their while to ask themselves whether a publication with the above mentioned elements of usefulness can help being valuable as an advertising medium to the telephone company which distributes it.

The grain book is only the start of this class of advertising at Buffalo. Plans are under way for the publication of other special directories based on the same idea. A lumber book will give a complete list of all persons in Buffalo and surrounding territory who are in any way interested in the purchase of lumber such as planing mills, saw mills, lumber dealers, contractors, etc. These books will be distributed to all lumber dealers in Buffalo and all people interested in the lumber business in the surrounding territory. All other classes of business will be grouped into books of this nature and eventually they will form a complete "library of ready reference," from a telephone standpoint, that will be invaluable to every business man.

The writer has gone into the statement of reasons for the publication of the book in detail, but the idea which is at the root of the whole plan is simply to get the people together who

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do business with one another and tell them how it may be done in the quickest way—by telephone. The grain book has done this for its users and it has proven to be the best advertising for long distance business the Inter-Ocean Company has yet put out.

Phantom Circuits and Phantom Transpositions

By N. C. Kissell.

A LONG telephone line must be transposed, in order to neutralize the disturbing influence of other neighboring wires. In the simplex circuit, using the two line wires to carry the "Morse" current no matter how many transpositions the line has the two wires will act as one, because the current is of the same strength and flowing in the same direction in both. They will cause no disturbance in the neighboring telephone circuits, as the latter are all transposed. Now, by taking two circuits to create a phantom, the latter will not be free from the disturbing influences of the telegraph current, as the phantom circuit will consist of two untransposed wires, as the wires of each line are only transposed within themselves. In Fig. 3 are shown three transposed telephone lines on the same arm, designated as *A*, *B*, and *C*. Connections for operating a simplex on a phantom are shown. The telegraph current flows in the same direction in both wires of *A*, and is indicated by the arrows. If this current is of positive potential, the instant current flows the wires *A* will receive a positive charge. This will induce a bound charge of negative potential, by electrostatic induction on the adjacent surface of the nearest conductor, which is *B*, a positive or free charge being repelled which will escape by any path offered. As both the wires of *B* are transposed at certain intervals, both will be equally exposed to the circuit *A*. This will cause no disturbance in the circiut *B*, as the induced current in one conductor is balanced by the current in the other; but by connecting circuits *B* and *C* together for a phantom, the disturbing currents induced in *B* will find a path through the phantom and currents will flow through the instruments, making them noisy. In the diagram the telegraph current is shown by the arrows, and the free charge induced in *B* is shown flowing through the phantom. From this it becomes evident that the phantom circuit will have to also be transposed as a whole to do away with these disturbing influences. Fig. 4 shows such a transposition. Here, as both sides of the phantom are equally exposed to the disturbing wire, the induced current in one will be balanced by that in the other, and the disturbing currents will be neutralized. This is shown by the arrows. Fig. 5 shows such a transposition on a pole line. Wires 3-4 pass to pins 2-3 on arm *B*, to pins 1-2 on arm *C*. Wires 1-2 pass under arm *B* to insulators placed on pins 2-3 under the arm, back up to pins 3-4 on arm *C*. The pins and insulators on cross arm *B* are shown in detail. In case the phantom transposition strikes at a point where one of the circuits has a transposition, the latter is made "running," and passed under the arm by means of an iron bracket which is bolted to the cross arm. The scheme of phantom transpositions is still in its infancy and the practice is to-day, to cut them in every two miles.

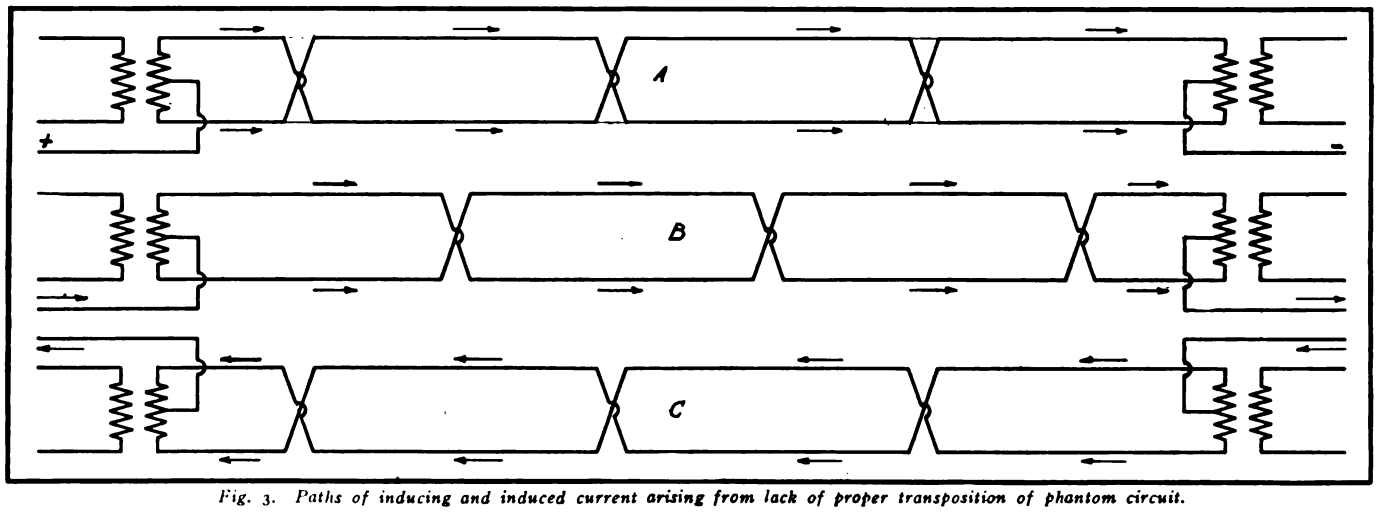

Fig. 3. Paths of inducing and induced current arising from lack of proper transposition of phantom circuit.

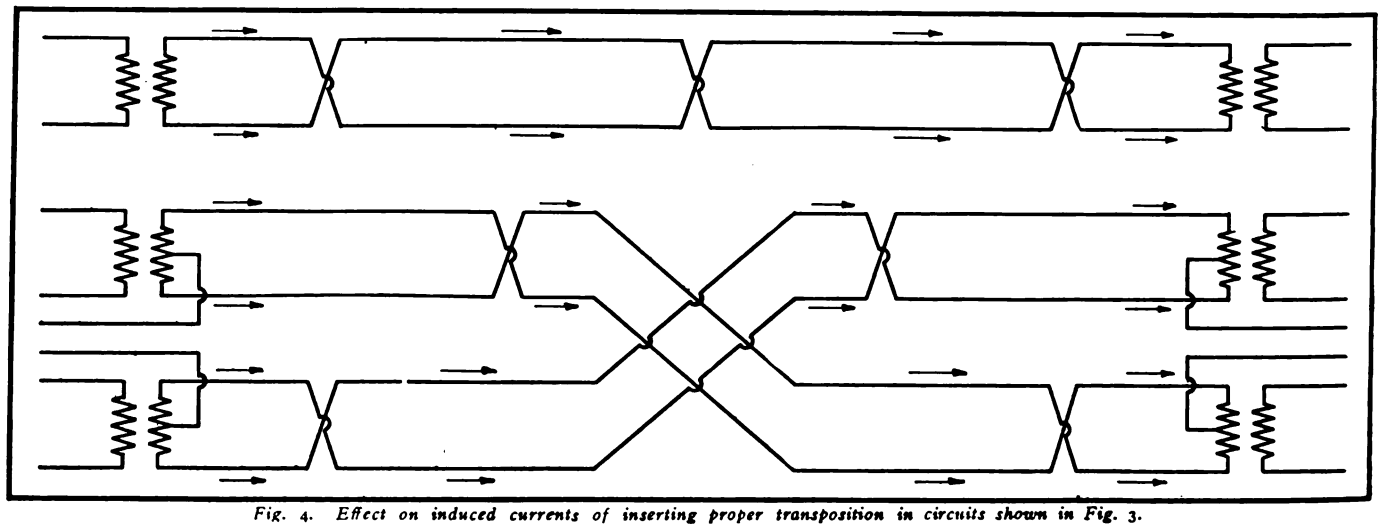

Fig. 4. Effect on induced currents of inserting proper transposition in circuits shown in Fig. 3.

To have a successful phantom then, the following conditions

Editor's Note.—This is the fifth article of a series dealing with methods of building up "superposed circuits" on telephone lines; concluded from issue of Sept. 21.

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prevail: the wires over which they are operated must be equal in resistance, inductance, capacity and leakage. The windings of the repeating coils must be similar, and the phantom as a whole transposed to neutralize inductive disturbances. This is perfectly feasible on comparatively short lines, but becomes more difficult as the lines increase in length on account of deterioration and atmospheric conditions. On long lines, however, the use of phantoms is most desirable on account of the cost of stringing wire, and, as will be noticed, the resistance of the phantom will be about half of the physical circuit for the same length, thereby cutting down the loss in amplitude of the sound waves. If all conditions are as stated, toll stations can be bridged across the physical circuits. While speech is being transmitted over the phantom the talking currents will flow in the same direction over both wires of the physical circuits. This being the case and both currents of the same strength, there will be no difference of potential across any point on the line wires, consequently none of the current will pass through the toll station. The main trouble with bridging toll stations across one of the physical circuits used as one side of a phantom is due to the carbon arrester placed at this point to protect the instrument. Particles of dust and dirt collecting on these will throw the phantom out of balance, and so they must be kept scrupulously clean. If repeating coils are used to compose a phantom, great difficulty will be experienced in ringing on account of the low ohmic resistance of the windings. Fig. 6 shows a circuit used which does away with this difficulty. Here at each end of the line are bridged two impedance coils from the centers of which the phantom is obtained. These coils are wound to the same resistance as the bells of the toll stations. The talking current divides through the two halves of the coils in opposition, thereby creating no magnetic flux in the core. The talking currents on wires *W-X* and *Y-Z* are shunted out by these coils on account of their high impedance to high frequency currents. The phantom currents divide equally over the line wires as before, providing their characteristics are the same. No difficulty will be experienced in ringing any toll stations on this circuit, nor will any of the stations have trouble in ringing the toll board. At each end condensers are placed in the circuit and these being of large capacity, the ringing and talking currents will pass through them readily.

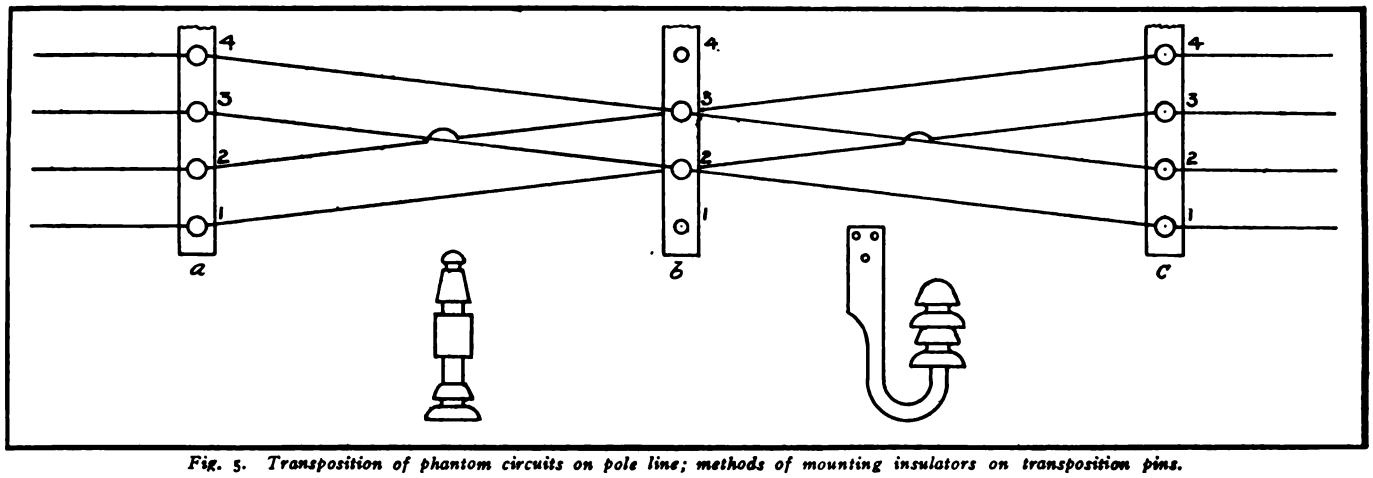

Fig. 5. Transposition of phantom circuits on pole line; methods of mounting insulators on transposition pins.

MASSACHUSETTS HIGHWAY COMMISSION RECOMMENDS THAT BELL COMPANY SHALL STRAIGHTEN OUT ITS RELATIONS WITH OFFICERS OF MUNICIPALITIES.

DISCLOSURES in the investigation now being conducted by the Massachusetts Highway Commission in Boston are reported to have brought up some very interesting facts about the relations of the New England Telephone and Telegraph Company to municipal officers and other persons of political prominence. The principal result of the investigation so far is a letter from the Highway Commission to the telephone company containing recommendations which in substance are as follows:

First—Discontinuance of the practice of furnishing frank books except to officers and employees of the telephone company and to officers of other telephone companies.

Second—Discontinuance of furnishing free telephones except to officers and employees of the company, charitable institutions and such as may be necessary for maintenance of the plant of the company.

Third—That quarterly reports to the commission be made by the company, containing names of all persons to whom frank books or free telephones have been furnished, said reports to be open to public inspection.

Fourth—Adoption of the same merit system in selection of employees in underground construction or street work as apparently obtained in other departments of the company, and permanent discontinuance of employment of men through political influence who do not render an equivalent for the wages they receive.

Fifth—Readjustment of all discounts to municipalities to a uniform basis.

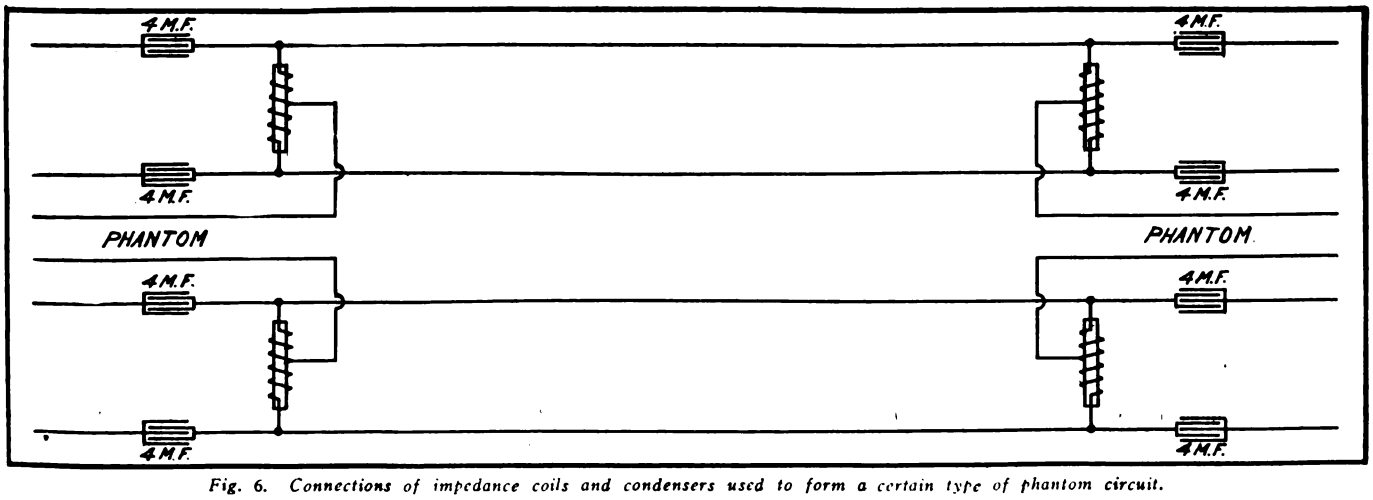

Fig. 6. Connections of impedance coils and condensers used to form a certain type of phantom circuit.

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The Editor's Opinions

THE NEW CONVENTION DATE.

FOR a radical departure the fixing of the place and date for the International Convention at Chicago during the Electrical Show this coming January is likely to be as pleasing to all Independent telephone men as any action the Executive Committee of the association could have taken. In the first place, it will give the operating telephone men a better opportunity than they have ever had before or could hope to have under any other plan for getting thoroughly in touch with the latest and best developments in the manufacturing branch of telephony. The manufacturers will concentrate their efforts upon a single display instead of having to make two exhibitions, one for the Electrical Show and another special one for the convention later on in the year.

The fact that the Electrical Show is to be open for two weeks will make it possible and profitable for them to install an exhibition of a very complete character. Their displays will be installed under conditions which will show much more clearly than has ever been the case at the hastily set up exhibitions at the conventions what great advances the manufacturers have made in the way of developing equipment, and it will be shown in an approach to practical working conditions.

The economy which this plan will bring about is an exceedingly valuable thing for both operating men and the manufacturers. The former will be able to cover in a single trip an examination of the latest types of equipment planned for their exchanges and also the business matters connected with the work of the association. The manufacturers, by concentrating their expenditures on a single exhibit, will be able to do themselves justice in the eyes of their customers and show their true importance in comparison with other branches of the electrical industry to an extent which will be most satisfactory to all parties. The members of the operating companies in the International Association and manufacturers alike are fortunate in being able to benefit by this wise action of the Executive Committee. The members of the committee are to be congratulated upon their foresight in promoting a departure from an established precedent which is likely to prove so popular among the interests affected by the change.

CONSTRUCTIVE ADVERTISING OF TELEPHONE SERVICE.

A GOOD many of the old timers in the telephone business were in the habit of thinking that the only reason for the existence of a contract department was to make a place for the company to keep employees who would be able to tell a man what he could not have. In these old-time contract departments, if, after all explanations had been made, the inquirer at the office persisted in wanting a telephone, the aforesaid employees would give him the necessary papers to sign.

If one of these people had been told that the time would come when advertising would play any part in extending telephone service he would have thought his informer was making a mistake in using the word telephone, and that the subject of the conversation was really some other business. Now-a-days, however, the people who control most of our telephone companies realize that they are in the business of selling telephone service. They are in it for a profit, too, and it takes no very keen vision to see that once facilities are provided, and classes of service and rates to be charged are fixed, the ratio of profit to investment is going to depend on the amount of business transacted over the wires.

Apply this to toll lines and it works out as a necessity for creating a demand for conversation during the day which will keep the amount of paid time for the use of the wires at a maximum. Advertising helps bring about this result in two ways: In the first place, by suggesting the superior convenience of the telephone as a means of communication, thus diverting to the telephone company's lines messages which would have otherwise gone by mail or telegraph. This kind of advertising only diverts communications from old channels. It is profitable, but a great many of the most alert telephone men are beginning to think it is too slow, and does not, after all, get at the fundamental idea which is the proper basis for advertising telephone service. The sort of advertising which is going to bring best results, so the more advanced students of publicity claim, is the kind that makes a man's search for business bring before him the name of some person at a time when he thinks he can make a profit, either directly or indirectly, by talking to him without delay. The advertising matter which fulfills this requirement satisfactorily is so arranged as to suggest also the telephone lines of a particular company as the best means of communication. A successful advertising scheme of this kind, such as is explained in Mr. Wadsworth's article, on another page of this issue, is bound to have a permanent value. It is in the truest sense creative advertising. It is the kind that makes men communicate with one another when they would not ordinarily find any occasion to talk. Best of all, it would appear to be a plan which will not lose its efficiency "when the new wears off," and the brief experience which has resulted from a trial of the idea seems to bear out this conclusion.

INDIRECT RETURNS FROM THE HOTEL BRANCH EXCHANGE.

CONTRACTS for hotel branch exchange systems are being signed so frequently that within a comparatively short time nearly every important hostelry in the country will have in every room an instrument from which patrons may talk with all persons who can be reached over lines extending from the nearest exchange.

The advertising value of this class of service should not be overlooked, and this is a point especially worthy of consideration by those Independent companies which have only been able for the past two or three years to give their patrons an extensive range of long distance connections. Traveling men are no less likely than others to criticise the telephone service which they find in any of the places they visit, and if their criticisms are favorable they are widely spread among business men all along the routes which they cover. Where Independent telephones are installed in hotels, and long distance facilities are used to cover a wide range of territory, as they frequently are by this class of customers, a two fold advantage accrues to the telephone company maintaining the system. In the first place, it picks up a good revenue on the spot; and in the second place, people in a half dozen surrounding towns who should be doing a considerable amount of long distance telephoning are again reminded of the facilities which are at their disposal. One reminder from an outsider in the shape of a genuine business call, and a satisfactory conversation, is worth more than a dozen invitations from the company.

THE MORAL INFLUENCE OF THE PHANTOM CIRCUIT.

WHEN two trunk lines are first combined to form a phantom circuit there are likely to be lively times among the troublemen. Single lines will work—after a fashion—if there are a few poor joints, patches of low insulation and other faults. Habit makes the testing and operating departments look upon these as necessary evils, and so they continue to exist without any attempt being made to remedy them. People in the exchanges say that No. 1 circuit is good, and No. 2 fair, recognizing a difference between them, and that both are off standard. As soon as phantom coils are put in, however, these circuits have to be made alike, and brought up very close to standard, in order to obtain the necessary balance. If this balance is not present they keep up a howl of protest until cured of every telephone ailment. Phantom circuits are good things in more ways than one.

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Legal Items of Telephonic Interest

CONDUCTED BY A. H. McMILLAN.

POWER OF COUNTY COMMISSIONERS TO LICENSE A PRIVATE INDIVIDUAL TO BUILD A LINE.

Has the board of county commissioners any power, either express or implied, to grant a license to a private individual to construct a telephone line along a public highway, that is in said public highway but along the outer edge of it? F. M. B.

THIS question has been recently asked of the attorney general of the State of Montana and the legal editor does not feel inclined nor competent to do otherwise than agree with so high an authority.

The attorney general's opinion states that section 1,000 of the civil code of Montana makes it appear that no license or authority need be procured from the Board of County Commissioners in order for a corporation or a private individual to construct a *public* line along the public streets and highways of the State. He is of the opinion that a telephone line constructed by a number of farmers for their own use would be a public telephone, under the law. Whether section 1,000 was intended to authorize a person to construct a private telephone line for his own use exclusively has not been decided, but he is of the opinion that the law was intended to cover only public telephones or those maintained by a sufficient number of individuals to give them a quasi-public character. Continuing, he states, that, in any event, the law does not give the county commissioners either express or implied authority to grant a license to construct telephone lines. If the line is a public or a quasi-public line the parties constructing it are given authority to do so by said section 1,000, subject only to reasonable regulations as to the manner of constructing the same as stated above.

INJURY FROM FALLING POLE RESET BY TRAVELLER.

THE Forest City Telephone Company of North Carolina was sued in the Rutherford County Court by the administrator of Mary Harton, deceased, for damages, on account of her death. The company's line stood beside the highway, on which road hands were ditching, so close that one of the poles became insecure and liable to fall. A road hand notified a lineman of the company of the pole's unsafe condition, but it was not attended to, and the pole fell across the road with the lines attached. It blocked the highway and a traveller set the pole back in the hole from which it had fallen in order to clear the way. He propped it up and left it, as he thought, more secure than before. Soon after, while Mary Harton was passing, the pole fell and killed her. The trial court granted judgment in favor of the defendant, from which appeal was taken to the Supreme Court of the State where the judgment was reversed.

The question in the case was whether the company was excused from liability by the action of the passer-by in resetting and propping the pole. The company contended that the person at fault was this traveller who propped the pole. The court held that if the company was originally negligent and the act of the traveller and the resultant injury to the deceased were events which the defendant might reasonably have expected to occur as a result of its original negligence, the company should have been liable.

The court also held that if the father of the deceased was in any way responsible for the accident by being guilty of contributory negligence, the company would not be liable. Harton vs. Forest City Telephone Co., 54 S. E., 299.

SALE OF TELEPHONE LINE AND EQUIPMENT.

IN a recent case arising in the Supreme Court of Iowa it appeared that the plaintiff had agreed to sell to the defendant a certain telephone system, and material and instruments on hand, or used in connection with the system, for a sum to be fixed by designated appraisers. The sale was to include telephone poles, lines, right of way, and the right to maintain the lines and poles as originally erected. The appraisers found that the fair value of the property to be transferred under the contract was $7,500. The bill of sale which was subsequently made provided for the transfer of "a line of telephone poles and wires, and rights of way for the maintenance of the line as now constructed." It was warranted that the property was clear and free from encumbrance, and that the seller had good and lawful authority to sell and convey the same. After paying $7,000, the defendant held up the balance due on the ground that it had not received all that it had bargained for. Evidence was introduced which tended to show that, over certain farms through which plaintiff's line passed, the plaintiff, instead of owning absolutely a right of way had only a permissive right to erect poles and run telephone wires, subject to be revoked at the pleasure of the owners, and that the plaintiff did not have a right of way which would entitle him to maintain his lines through these farms and to enter the farms for the purpose of making repairs as against the objection of such owners. The defendant contended that this was inconsistent with the plaintiff's warranty that the property was free from all encumbrances. The court decided that the contract did not contemplate the conveyance of an absolute right of perpetual maintenance of the lines where constructed, but only the right which the seller was enjoying at the time of the transfer. As far as this contention was concerned, then, the plaintiff was entitled to recover the balance due, but it appeared that the contract also provided for delivery of certain materials and instruments, and the plaintiff offered no proof that the materials and instruments had ever been delivered. For this reason, it was held that the court would not be justified in directing a verdict for the plaintiff. Lattner vs. Interstate Telephone Company, 112 N. W. Rep. 653.

CARE REQUIRED IN MAINTAINING TELEPHONE WIRES OVER TROLLEY WIRES.

THE judgment obtained by Mary Politowitz against the Citizens' Telephone Company of Kansas City, Mo., has been affirmed by the Court of Appeals of that city. The action was for injuries to the plaintiff caused by coming in contact with a broken telephone wire. The petition alleged generally that its wires were negligently constructed and specifically that they were not properly insulated nor attached to the poles; that they were strung in close proximity to light and power wires so that they were likely to become charged, burned, break off and fall from their fastenings; that one of the company's wires falling became charged with electricity from the trolley wire. The court charged the jury that it was the company's duty to use care commensurate with conditions to prevent the wires from coming in contact, and if it failed to do so and the plaintiff was injured as a result the company was negligent. These instructions were held to be unobjectionable as not without the issues raised by the pleadings. Politowitz vs. Citizens' Telephone Company, 99, S. W., 756.

ANTI-DISCRIMINATION LAW AND LABOR TROUBLE.

In case of a strike would a telephone manager or operator be liable to punishment for refusing to connect a subscriber with any number he wanted to get?

Information will be appreciated. W. W., Mississippi.

THE laws of Mississippi provide a punishment if any official or operator of any telephone or telegraph company shall refuse to send or transmit any message delivered to him or her, and such person shall upon conviction be fined not exceeding $200 or imprisonment in jail not exceeding three months or both. If such official or operator refuses to transmit a message tendered by an official of the State or United States, he is liable to a fine not exceeding $2,000, or imprisonment not exceeding one year or both. This law would be enforceable whether there were any strike in progress among the telephone company's employes or not.

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OTTAWA COMMISSION MAKES RECOMMENDATIONS GOVERNING EMPLOYMENT OF TELEPHONE OPERATORS.

THE recent strike of telephone operators at Ottawa, Ont., Canada, led to the appointment by the Dominion Government of a commission to investigate the dispute between the Bell telephone company and its employees. After the investigation recommendations were made substantially as follows:

Six-hour day for operators, with proper reliefs and prohibition of overtime.

One day's rest in seven and a weekly half-holiday.

Age limit of 18 years for operators.

Limit hours of continuous work without intermission from 2½ to 4½ hours, according to conditions.

Examination as to health, effective ventilation and sterilization of instruments.

That the criminal law respecting telegraph operators be applied to telephone operators as well.

That a permanent board of conciliation be created, composed of representatives of the company and operators.

BULLETIN OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION.

No Compromise.—At practically every State and Provincial Association meeting held since the Chicago Convention, resolutions have been adopted endorsing the stand taken by the International Association in denouncing connection, of any sort or for any purpose, with the Bell system, and indications are that similar sentiments will be expressed at Independent gatherings now being arranged. This is encouraging, as a proof that the Independents of the United States and Canada realize their strength, and recognize the folly, not to say danger, of any affiliations which would tend to weaken their position by permitting disintegrating influences to creep into their ranks.

Leaving sentiment entirely out of the question, in view of the fact that the progress of the Independent has been made in the face of the most determined opposition by the interests now proposing alliances, common sense would dictate a strictly independent policy as the safest course for the Independent interests, now that they have the situation in their own hands. "No compromise" is a good slogan.

Helpful Methods.—Officers of the Missouri Association are sending out a series of very strong, helpful, encouraging letters to their members, which have been productive of great good. The Ohio Association prepares a complete, detailed statistical report of the situation in that State at the end of March and October in each year, furnishing copies free to its members to be sent out to their stockholders, bankers, prospective investors and for use in advertising. The Michigan Association has just issued a neat handbook of general information regarding the telephone situation, for the use of its members. Similar books were issued by the Nebraska and Indiana Associations last year.

The foregoing are merely cited as examples of concrete methods by which the various State Associations can strengthen their organizations and assist their members. Full particulars regarding these plans may be secured upon application to the Cleveland office. We would like to hear from the officers of any State organization regarding methods which have proven particularly helpful. Pass a good thing along!

Use Your By-Products.—Many progressive Independent telephone companies are prone to overlook the possibilities of directory advertising. For a number of obvious reasons space in telephone directories is particularly valuable from an advertising standpoint. With proper methods the telephone company can secure considerable income from this source, often sufficient to leave a profit after paying for the cost of publishing its directory, without any sacrifice of dignity or interference with the purpose for which a telephone directory is issued. This matter is worthy of attention. Make your directory at least pay for itself.

Arbitration.—Division of territory is a subject which often demands the attention of State and District meetings. In order to properly handle this subject and settle disputes which, for any cause, may arise from time to time, each association should have its Arbitration Committee, with definite rules of procedure and power to act authoritatively on cases brought before it. Copies of arbitration rules adopted by the International Association, and those in use in a number of States, may be had free upon application to the Cleveland office.

Shield Advertising.—Are you giving this important subject the attention it deserves? Take advantage of the discontinuance sale of the Supply Department. We have sold out entirely of a number of the "Shield" supplies, but have enough of others left to take care of orders from early applicants. Colonial lanterns and large transparencies are particularly good values at present prices. Get yours while you can.

Identify Your Company as Independent.—Make the people realize that there is a great Independent system, of which the various local companies are a part. All local people should identify their company as "Independent." Individuality is indissolubly bound up with the general welfare of the movement. Use the "Shield" as the main emblem; it's important.

FINANCIAL STATEMENT, SEPT. 16, 1907.

Apportionments by Executive Committee for 1907-8.

Associations:		
Arkansas	$100.00	
California	300.00	
Canada	25.00	
Illinois	750.00	
Indiana	1,000.00	
Iowa	700.00	
Kansas	400.00	
Kentucky	200.00	
Maine	25.00	
Michigan	750.00	
Missouri	500.00	
Nebraska	350.00	
New York	300.00	
North Carolina	25.00	
Ohio	1,300.00	
Oregon	40.00	
Pennsylvania	500.00	
Texas	100.00	
Vermont and New Hampshire	25.00	
Virginia	50.00	
Wisconsin	250.00	
West Virginia	250.00	
		$7,940.00
Contributions and pledges:		
Switchboard and Telephone M'f'rs; Equipment Stamps; Mag. tels. and drops	$4,000.00	
C. B. tels. and drops	2,500.00	
Supply dealers and jobbers	5,000.00	
Engineers	250.00	
Journals	500.00	
Operating companies	750.00	
		13,000.00
General:		
Honorary membership fees	$750.00	
Miscellaneous accounts	671.74	
		1,421.74
Total		$22,361.74
Paid in, June $50, July $235		285.00
Balance to be collected		$22,076.74

Annual assessment, 1c. per unit. A unit is an operating telephone or a circuit mile of toll line. Assessments are payable monthly, and are based on number of units in respective associations at last convention.

Fiscal year, 1906-7, closed May 25.

Total receipts this year to date, including special committee balance	$12,847.94	
Total expenditures, including accounts accrued before last convention	12,364.46	
		$484.48
Accounts payable	$333.05	
Estimated expenses for next thirty days	420.00	
(Publicity department not started)		753.05
Deficit October 16		$268.57

N. B.—The association should have a fund of $1,500.00 per month for the next eight months for publicity purposes and $1,000 per month for strengthening and extending the organization. Nothing will be done by the present administration until necessary funds are pledged to defray the cost of the undertaking.

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"THE ORIGINAL GRAY."

Gray Pay Stations Pay

165,000 of our Stations in use is our Best Indorsement.

They are Automatic—no Levers or Springs.

GRAY TEL. PAY STATION CO.

HARTFORD, CONN.

We send Catalogue on request.

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE.—Telephone exchange and from 100 to 200 miles long distance line in Missouri, making good money; for sale at a bargain. Full particulars and satisfactory reason for wishing to sell on application. Address Box 932, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 932

FOR SALE.—Telephone system; 250 phones, about 200 miles pole lines. Four switchboards; price, Forty dollars per phone, 60 per cent. cash, balance on year's time. Write T. F. Poole, Grainfield, Kan.

FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

CASH paid for telephone photographs.—Telephone engineer wishes to secure photographs of standard and new methods of open wire line and aerial cable construction, conduit laying, manhole building, etc. Will pay 75 cents each for acceptable "solio" prints. Address, Box 902, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 902

WANTED.—Two or three good telephone men for troublemen or managers of magneto exchanges of 100 to 300 subscribers. Wages $30 to $50 per month. State experience and give reference. S. H. Young, Sparta, Tenn. 934

WANTED—Position as manager by man with several years' telephone experience. Am at present employed by Bell company, but have good reason for changing. Capable of managing a good exchange and can furnish best of references. Address, Box 918, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 918

POSITION by good switchboard or instrument man. Married, sober, not afraid of work; wish steady position, where a steady cause is appreciated. Satisfactory references. Territory matters not. Let me hear. Address Box 927, care of AMERICAN TELEPHONE JOURNAL, 100 William St., New York 927

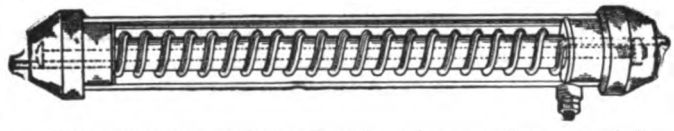
WANTED—A young man with seven years' practical experience in maintenance and construction work with the Bell company in the West, desires some position of responsibility with chances of advancement. First class private exchange installer. Address Box 926, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 926

ARCING CANNOT BURN OUT SKY ROCKET ARRESTERS because the fifty inches of discharge coil are covered with a coating of zinc.

There are three monatomic metals which have the quality of resisting the formation of an electric arc.

Of these three, zinc has this quality to the highest degree.

Thus by its use all possibility of an arc forming during a severe discharge and destroying the arrester is obviated.



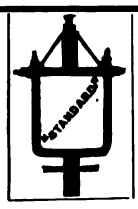
The SKY ROCKET is the only multi-gap, reactance, lightning arrester in which this feature is embodied.

Commended by High Class Engineers Everywhere.

WRITE FOR SAMPLE AND PRICES TO-DAY

CHANCE MFG. CO., CENTRALIA, MO.

Telephone Wire and Cables



BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables — **Aerial—Underground—Submarine Lead Covered Cables**

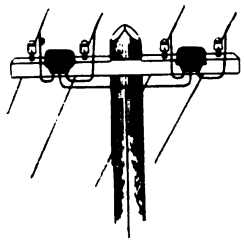
TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company

PITTSBURGH, PA.

Boston. New York. Philadelphia. Atlanta, Ga. Chicago. St. Louis. San Francisco, Cal. Los Angeles, Cal.

ALWAYS IN SEASON
Chapman Lightning Arresters



assure quiet lines in the stormy Winter season.

Being absolutely weatherproof they are placed at the most exposed parts of the line and drain it of static charges more effectively than a sewer drains water off a street, because Chapman Lightning Arresters never "clog up."

Built for business and always "on the job."

Get bulletin and prices without delay.

MINNESOTA ELECTRIC CO., Minneapolis, Minn.

H. E. COBB, Selling Agent, 1501 Monadnock Block, Chicago, Ill.

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Successes and Difficulties of Operating Companies

MICHIGAN'S BIG TELEPHONE COMPANY SHOWS DECIDED ADVANCE BEYOND LAST YEAR'S GOOD RECORD.

THE progress of the Citizens Telephone Company of Grand Rapids, Mich., which has just been made public through its annual report, has caused many telephone investors to sit up and take notice. The report shows a constant increase of business and a decrease of expenses in spite of the increase of cost of all supplies used by telephone companies.

The annual report includes reports by C. E. Tarte, general manager of the company, and E. B. Fisher, secretary. Probably the most interesting feature of the general manager's report is the increase in the number of telephones in use, 26,123, as compared with 23,648 in use in 1906 at the date of the annual report, a net gain of 1,051 telephones on the Grand Rapids exchange and 1,424 in outside exchanges. The company now owns and operates 78 exchanges, besides 160 toll stations.

The net gain in Grand Rapids is the second largest in ten years. One thousand new switches were placed in service the latter part of 1906 and one thousand more are now being installed.

About $80,000 worth of cable, aerial and underground, was installed during the year. A great deal of this is still available for future growth, so that the prospects are good for a considerable increase in the number of Grand Rapids subscribers at a comparatively low cost.

Toll line development has been slow on account of the high prices of copper. However, 43 miles of poles were added, 227 miles of copper metallic circuit, and 48 miles of iron metallic circuit. This makes the entire toll system 1,487 miles of poles, 2,531 miles of copper metallic circuit, and 1,100 miles iron metallic circuit.

Satisfactory arrangements have been made with the Lansing Council concerning the rate to be charged for telephones, and the company is going ahead with the establishment of its new service in the capital city. The new Holland exchange has also been completed. Holland now has four trunk lines to Grand Rapids.

The Home Telephone Company's plant in Detroit will be completed and in operation with from 12,000 to 15,000 subscribers in a few months, and this in addition to toll line development being made by the Interstate Company in the eastern part of the state will increase wonderfully the number of subscribers that can be reached in Michigan by users of Independent telephones.

The toll line that is now being built by the Citizens company to Cassopolis to connect with lines that are built from South Bend by the Home Telephone Company of South Bend will give first-class connection with the 182,000 Independent telephones in Indiana. At Cassopolis the Citizens company will also connect with the toll lines of the Southern Michigan Telephone Company. This company is doing a large amount of work in St. Joseph, Branch and Hillsdale counties, and has exchanges or toll stations in almost every city, village and hamlet in these counties.

The proportion of gross expense to gross income was decreased during the year from 52 per cent. to 51 per cent.

The report of the secretary shows:

EARNINGS.

Exchange rentals	$446,528.93	
Long distance income	104,050.94	
Other income	9,328.86	
		$559,908.73

EXPENSES.

Operating, maintenance, reconstruction and depreciation	$282,043.45	
General expense, interest, taxes, etc	51,457.67	
Dividends	203,399.71	
Carried to surplus	15,000.00	
		$559,908.73

In addition to this increase in revenue, a much larger sum of undivided earnings was charged off to depreciation—besides keeping the plant in good condition—than was the case last year. The surplus account is $125,000 and the management asserts that the entire property is to-day in a better condition than it was a year ago.

A comparison with previous years shows:

	Capital Stock Issued.	City Telephones in Service.	Telephones in Entire System.	Toll Line Pole Mileage.	Toll Line Circuits Mileage.	Toll Points Citizens System.	Gross Earnings.	Dividends Paid.
1896	$47,600	832	....	....	....	...	.....	.....
1897	86,735	1,976	....	....	....	...	$43,742.05	.....
1898	129,960	2,339	....	....	....	...	57,524.50	$7,737.00
1899	205,850	2,915	....	200	400	...	72,832.56	13,493.43
1900	391,125	3,347	5,459	400	900	84	104,173.81	22,971.68
1901	571,380	3,588	6,960	774	1,660	88	147,557.64	39,544.32
1902	847,065	4,523	10,456	858	1,917	105	198,110.98	56,255.75
1903	1,212,880	5,165	13,981	1,020	2,164	107	274,343.79	82,777.73
1904	1,609,280	5,605	16,388	1,116	2,453	130	343,392.43	112,150.16
1905	1,910,985	6,633	19,742	1,352	3,008	138	418,441.27	139,551.63
1906	2,324,940	7,823	23,644	1,444	3,356	156	498,687.67	168,902.33
1907	2,779,635	8,874	26,123	1,487	3,631	151	559,908.73	203,397.71

The net gain in the Marshall, Battle Creek and Jackson lines, which are owned by the company, is 393 telephones, making the net gain for the year 3,039.

The report to the stockholders says: "You now have an investment of capital stock issued of $2,850,000. No other telephone system in North America involving that amount of capital stock can show larger results for the investment. An absolute control of exchanges with more than 30,500 telephones, of almost 1,500 miles of long distance toll line mileage, and of more than 3,600 miles of toll line circuits (which total will be materially increased before the year closes), represents results indicating wise use of your funds and economical construction. With becoming modesty the management of your company is inclined to suggest that it is doubtful if any like property in the country can show so many telephones in service and so much long distance mileage, chiefly copper, for anything like a similar amount of money invested. There are many plants where each station in the system represents nearly or quite double such an amount of securities issued. Your money has unquestionably bought good value in material and labor in the extension of your system.

"You have a full metallic system. Your property has earned every dollar of the $846,781.74 of dividends already paid you, the $125,000 in the surplus account, depreciation has been amply—fully—cared for, and the plant is in better condition to-day than ever before. It is growing steadily and rapidly. Your directors are of the opinion that another and the eighth increase of the authorized capital should be made."

Accordingly the capital stock of the company was increased from $3,000,000 to $3,500,000, and certificate of this increase was filed with the county clerk following the annual meeting.

Discussing this increase of the capital stock of the company, and the practice of the company to keep up the sale of its stock, Secretary Fisher gave out an interview giving reasons for the practice. The company has advertised that it has stock for sale, and some prejudiced and poorly informed persons have taken occasion to criticise this practice of the company, saying that it would not pay its regular 8 per cent. annual dividend without issuing more stock, and after people refused longer to buy the stock, the deluge would come.

"Of course the statement is absurd on its face," says Mr. Fisher. "We charge off maintenance and depreciation, and build up a surplus fund, and still pay a dividend. Where's the ground for criticism? All money received goes into the work of extending the service, putting up new poles and buying new telephones. To add over three thousand telephones during a year costs money; and how are you going to buy them without getting more money? And so long as proper depreciation is charged off each year before putting aside money for dividends and for the undivided profit fund, what's the objection?"

The only change made in the list of directors at the annual meeting was the election of John B. Martin in place of E. G. Studley.

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An Unusual Investment Opportunity

A System of Rapid Automatic Telegraphy that transmits messages at the rate of 50 words for 25 cents, anywhere in the United States.

...The...

TELEPOST

An Independent Telegraph Corporation, to be operated in conjunction with the Independent Telephone Companies of America, with simultaneous use of wires.

Capital Stock, $18,000,000

VOTING TRUSTEES

HON. JOHN W. GOFF, New York, Judge of the Supreme Court.
S. S. M'CLURE, New York, Editor and Founder of McClure's Magazine.
H. D. CRITCHFIELD, Milwaukee, Wis., President Milwaukee Independent Telephone Co.
F. W. SHUMAKER, New York, Treasurer Sterling Debenture Corporation.
H. LEE SELLERS, New York, Secretary R. H. Sellers Company.

DIRECTORS

CAPT. W. J. BARNETTE, U. S. N., Washington, D. C.
General Board, Navy Department.

A. K. BROWN, Chicago, Ills.,
President Kenwood Trust and Savings Bank, Chicago.

JOHN M. CARRERE, New York,
Carrere & Hastings, Architects.

THOMAS CONYNGTON, New York, Conyngton & Harrison, Attorneys.

H. D. CRITCHFIELD, Milwaukee, Wis.,
President Milwaukee Independent Telephone Company.

HON. WILSON H. FAIRBANK, Warren, Mass.,
Ex-State Senator, Massachusetts.

R. H. SELLERS, New York.
Secretary and Treasurer.

H. LEE SELLERS, New York,
President.

C. H. SILLIMAN, New York,
Banker.

The Telepost Company owns all the rights and patents of the Delany System of Rapid Automatic Telegraphy. After a successful, practical demonstration over a broad circuit in actual work, covering a long period, this system is now commercially perfected.

The Telepost Company is now preparing to construct its Boston-San Francisco Trunk Line. Financial arrangements are in the hands of the Sterling Debenture Corporation of New York, who are authorized to receive advance subscriptions, in small blocks only, from the Independent Telephone operators of the country.

Independent Telegraphy is the natural ally of Independent Telephony. Co-operation will assure rapid installation in all sections of the country.

The profits that will come to the original shareholders of the Telepost may be judged from the fact that, even with its greatly reduced rates, the new company will make a net profit per message three times as great as the old-time systems can make with their high rates. And this enormous profit will be distributed over an $18,000,000 capitalization, as against the $218,000,000 capitalization of the old systems.

With the unusual protection afforded to the small shareholders through the provisions of the Board of Voting Trustees, an investment in Telepost stock is as safe as a government bond, and the opportunity for subscribing is not likely to remain open long.

Write for booklet No. 126, which contains a full prospectus for investors

STERLING DEBENTURE CORPORATION

BRUNSWICK BUILDING, MADISON SQUARE, NEW YORK

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Successes and Difficulties of Operating Companies

The board of directors for the coming year is as follows: C. F. Rood, E. B. Fisher, Philip Graham, Lester J. Rindge, Gaius W. Perkins, J. B. Ware, Edward Fitzgerald, William J. Stuart, Cyrus E. Perkins, Robert D. Graham and John B. Martin. The directors will meet in a few days to elect officers for the year.

GOOD SHOWING OF THE KEYSTONE TELEPHONE COMPANY OF PHILADELPHIA.

THE Keystone Telephone Company, of Philadelphia, Pa., shows a large increase in earnings over the past year, as indicated in the figures furnished by the brokerage firm of Fisk & Robinson. The gross earnings for the year ending June 30th, 1907, amounted to $995,752, an increase of $174,910 over the preceding twelve months.

INDEPENDENT TELEPHONE CONVENTION TO BE HELD IN JANUARY—ASSOCIATION HEADQUARTERS TO BE REMOVED TO CHICAGO AT ONCE.

THE Executive Committee of the International Independent Telephone Association met on Friday, September 20, at the Grand Pacific Hotel, Chicago. Many important matters were brought up for consideration, but probably nothing will interest operating men so much as the decision to hold the annual convention in January, 1908, while the famous Chicago Electrical Show, which is set for the dates between January 13 and 25, is in progress. The headquarters of the association will be moved to Chicago in a short time, as a result of a decision reached at this meeting. Other important matters were discussed.

An important resolution passed by the Executive Committee is as follows:

WHEREAS, the City Council of the city of Chicago is considering the advisability of compelling the Chicago Telephone Company to connect with the lines of Independent telephone companies, and

WHEREAS, we believe it to be for the best interests of the citizens, mercantile and manufacturing interests of Chicago that the city should have an up-to-date local and long distance Independent telephone company; therefore be it

Resolved, that we, the Executive Committee of the International Independent Telephone Association, are unalterably opposed to any Independent connection with the Bell telephone concern in the city of Chicago or elsewhere, as well as being opposed to any terminal for the Independent telephone companies to be used in connection with the Bell system.

BROKEN ARROW TELEPHONE CO.
Broken Arrow, I. T.

American Telephone Journal,
New York, N. Y.

Gentlemen:—

Enclosed please find a draft for one dollar to renew my subscription.

A cyclone struck our plant the other day and took most of it, but I still managed to get a dollar for the JOURNAL.

Respectfully yours,

FRANK McGUIRE,
SECRETARY AND MANAGER.

The finest compliment we have ever received—from a telephone man who can get along without any plant, but cannot dispense with American Telephone Journal!

CHICAGO ELECTRICAL SHOW TO BE HELD JANUARY 13 TO 25—INDEPENDENT TELEPHONE CONVENTION ALSO COMES BETWEEN THESE DATES.

TELEPHONE men will be more interested in this year's Chicago Electrical Show than ever before because its occurrence will be coincident with that of the convention of the International Independent Telephone Association. The management of the show has fixed upon the dates of January 13 to 25, 1908, for the great exhibition which is to be held, as usual, at the Coliseum.

The officers of the Electrical Trades Exposition Company this year, elected at the recent meeting of stockholders, are Samuel Insull, president; E. B. Overshiner, vice-president; Stewart Spalding, secretary-treasurer. The Executive Committee is made up as follows: E. B. Overshiner, chairman; Louis A. Ferguson and Stewart Spalding. The Board of Directors are Samuel Insull, G. H. Atkin, Stewart Spalding, E. B. Overshiner, George B. Foster, T. F. Gaylord, Louis A. Ferguson, H. B. McMeal and H. V. Bennis. The show will be managed by Homer E. Niesz, who was in charge of the very successful exhibition last winter.

Telephone exhibits are to have a special section reserved in the Coliseum and manufacturers and supply dealers should apply at once for space to Homer E. Niesz, manager, 1006 Monadnock Building, Chicago, Ill.

CUMBERLAND COMPANY CARRIES ISSUE OF EXTRA CHARGE OVER LOUISIANA RAILROAD COMMISSIONS HEAD TO FEDERAL COURT.

GENERAL COUNSEL W. L. Granbery, of the Cumberland Telephone and Telegraph Company at Nashville, Tenn., has filed application with Judge David B. Shelby, of the United States Circuit Court at Huntsville, Ala., asking an injunction against the authorities of the State of Louisiana interfering with the company in the collection of extra charges for service on submarine cables, long distance service and exchange business. The petition also asks a restraining order against the Louisiana officials and courts from instituting or causing to be instituted any suits for the collection of fines imposed by the Louisiana Railroad Commission or other authorities. The petition contains thirty typewritten pages and reviews all the difficulties between the company and the Louisiana State authorities.

Some time ago the Louisiana Railroad Commission took up the matter of telephone rates on petitions from localities where the company advanced its rates and in some instances ordered a reduction of the new rates. The company has made no reductions and now seeks to have the Federal courts interfere. Judge Shelby has taken the case under advisement, but has indicated no time when a decision might be expected, so the question is still undetermined.

RETURN TO ORIGINAL RATES CAUSES RURAL LINE SUBSCRIBERS TO BOYCOTT INDEPENDENT COMPANY.

THE country patrons of the Hagerstown Telephone Company, owned by L. N. Boyd, of Cambridge City, Ind., have declared a boycott on his lines. It seems that about three years ago the company voluntarily reduced the rate to party line subscribers from $1.25 to $1.00 per month. On account of the increase in the prices of materials and labor, however, the telephone users were recently served with notices that the rates in the future would be $1.25 as originally charged. A fever of criticism and complaint sprung up all along the lines, and several subscribers have entered into active opposition to the increase. They are circulating for signature papers which bear the statement that if rates are raised the signers will have their telephones removed. The company is making constant improvements in its lines, and believes that when the new rates actually go into effect on October 1st it will have no difficulty in convincing its most desirable subscribers that it will be to their interest to pay the new rates, and continue to receive the very best possible service.

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Third Annual Electrical Show

COLISEUM, CHICAGO

January 13th—25th, 1908

APPLY FOR SPACE NOW

Electrical Trades Exposition Co.

1006 Monadnock Block

CHICAGO

HOMER E. NIESZ
Manager

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the city will chop down the telephone poles wherever they are the property of the Pacific Company or it will remove the wires where they occupy poles belonging to other corporations and will charge the expenses thus incurred to the telephone company.

COLUMBUS, GA., CITY COUNCIL IS "ACTING KITTENISH."

At the last meeting of the City Council of Columbus, Georgia, a resolution was introduced calling for action by the board of railroad commissioners of the State in the matter of reducing telephone gas and electric power rates.

The present Independent telephone rates in Columbus are given as $3.00 for business telephones and $1.50 for residence service; the Bell company charges $1 more for each class.

These rates the resolution desired to cut to $2.50 for business and $1.50 for residence.

As the fathers of the resolution were not absolutely certain as to the present rates charged the public for the various commodities they wished to regulate, a committee was appointed to ascertain these rates and report at the next meeting of the Council!

TROUBLE OVER INCREASED NIGHT RATES IN MISSISSIPPI.

THE Cumberland Telephone & Telegraph Company is having its troubles with the Railroad Commission of Mississippi and some interesting points will be brought out in the case to be heard in the Federal Court at Jackson in November. Attorney General Fletcher will handle the case personally for the state and will make every effort to have the Commission's order sustained. The Commission refused to allow the Cumberland company to increase its night rates to equal the day rates for long distance service. The company increased the rates, however, and in the Federal court asked for an injunction preventing the Railroad Commission from interfering with its plans. The temporary injunction was granted and the case will be heard in November.

The bill filed by the Cumberland company also asks a restraining order against the Commission forcing the company to maintain its old rule of allowing free use of county lines by regular subscribers. Formerly the company allowed regular subscribers to use the country lines within the same county free except in cases where another exchange was operated. Recently the Cumberland company broke this agreement and the Railroad Commission ordered the company to continue the free service. Since the Commission began working up its case, however, the officials of the Cumberland company contend that this part of the bill got in by mistake and state that they will withdraw this portion of it. The Attorney General is inclined to believe the company is sincere in this, but President McNair of the Commission does not think so and is prepared to stand on the orders and contend for the free service as well as half rates at night. The Commission has sent a man to Nashville to examine the books of the company in connection with its case in the interest of cheap night rates.

The Official Emblem of the Canadian Independent Telephone Association.

NEW TELEPHONE INVESTMENT COMPANY.

THE Theodore Gary Investment Company announces the opening of its offices in the Telephone Building, Macon, This company is incorporated with a capital of $200,000, and is organized to deal generally in securities of first class telephone companies.

IMPORTANT WORK FOR DISTRICT ORGANIZATIONS TO BE PLANNED IN NEW YORK STATE MEETING NEXT WEEK.

NEW YORK Independent telephone men are going to turn out in large numbers for the convention to be held at the Telephone Building at Syracuse on September 25. R. M. Eaton, secretary of the association, announced that further developments will be made along the line of building up an organization capable of securing and giving out promptly all information necessary to aid its members. It has been suggested that the state shall be newly divided up into districts, which will permit district organizations to be formed in such a way as to get together on a good working basis. When this is done each district will elect a secretary, and furnish him with complete records. He in turn will pass the necessary information along to the state secretary, who will have at all times a complete, up-to-date record of the progress made by the Independents throughout the state.

It is of the utmost importance that this work should be completely planned at this convention, as its success means a great deal to every Independent exchange in New York. The Independent association is likely to be called upon to keep careful watch of legislation during the coming season, and a committee is to be appointed to give this matter its attention. Many other important matters will come up, and every member who can possibly do so should be on hand prepared to active co-operate in the plans which are going to help the business of all the companies which are represented in the association. Other features will be useful to operating men.

TELEPHONES AID THE CURBING OF RECKLESS MOTOR DRIVING IN NEW JERSEY.

THE freeholders of Elwood, N. J., have decided upon the installation of a telephone system along the roads in the county frequented by motorists, as a means of curbing the reckless driving which is taking place in that section. Lines will be constructed from one town to another, with stations at various intervals, for the purpose of notifying constables at the town points of the passage of speeding motorists, who will then be hailed upon their arrival in that town, and brought before a justice. The question of automobile speeding is one of some moment in this section, as the motorists do not seem to particularly respect the ordinances in relation to speeding nor do they seem to be particularly afraid of a man in the middle of the road with a shotgun, but whirl past him without even hesitating. This plan of telephoning ahead will, however, give the constables an opportunity to prepare some positive means of stopping the offenders.

H. M. KEYS ELECTED SECRETARY OF ALBANY HOME TELEPHONE COMPANY.

MR. H. M. KEYS, who has been general manager of the Albany Home Telephone Company since November, 1905, has recently been elected secretary of the company to succeed H. J. Prince, Jr. Mr. Prince in resigning this office has left the telephone business entirely to engage in other affairs. Mr. Keys, who is a graduate of the Massachusetts Institute of Technology, was engineer of construction for the Keystone Telephone Company, of Philadelphia, before coming to Albany. He has been very successful in building up the business and plant of the Albany Home Telephone Company, and will now combine his former duties as manager with those devolving upon him in his new position as secretary.

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Telephone Manufacturers' Association Asked August Circulation

American Telephone Journal's Was

30,244

And We Proved It

Advertisers advertise for results. They don't particularly care what the circulation of any paper is so long as they receive inquiries and that these inquiries are from a class having the purchasing power.

A publisher, if his conscience is easy, can claim anywhere from six to nineteen thousand circulation for his paper, even if it is only four thousand or less a month. And this claim may influence a few concerns that don't take the trouble to look into the merits of the paper and consider it from the real circulation basis—strength of the reading pages, and their interest to the buyers of the class reached.

Such a publisher may even issue a *sworn* statement, backed up by a printer's *sworn* statement. A sworn statement is good so far as it goes.

But such a sworn statement shows only the number of copies printed.

It doesn't satisfy an advertiser as to the number of copies circulated and the number of readers of the paper.

For these reasons AMERICAN TELEPHONE JOURNAL has never issued sworn statements and has had little to say about *quantity* of circulation—dwelling on *quality* principally.

United States Post Office receipts are the only unfailing evidence of actual circulation within the United States, its possessions, and Mexico.

Probably the publishers of AMERICAN TELEPHONE JOURNAL would not have gone into this circulation talk at all had it not been for the action taken at the last meeting of the TELEPHONE MANUFACTURERS' ASSOCIATION.

At this meeting, the following resolution was passed:

"RESOLVED, that the President of this Association be directed to secure properly audited reports of the circulation of the different telephone trade journals and report at the next meeting of this Association."

AMERICAN TELEPHONE JOURNAL received a copy of this resolution on August 21st. It was accompanied by a letter dated August 19th, from the President of the TELEPHONE MANUFACTURERS' ASSOCIATION, which letter presumably was sent to the other telephone journals.

The letter follows:

"The writer respectfully requests that you forward a certified copy of Post Office receipts for the second week in *August* and statement showing number of paid subscriptions at that date.

"The members feel that in buying their advertising they should be correctly informed as to the circulation of the several publications.

(Signed) "J. G. IHMSEN,
"President Telephone Manufacturers' Association."

By return mail the President of this Association was forwarded the POST OFFICE RECEIPTS of AMERICAN TELEPHONE JOURNAL not alone for the second week in August, but for all the issues in that month up to the receipt of the letter. Those receipts are now in the hands of the President of the Manufacturers' Association, and no doubt can be seen by any advertiser interested. (Post Office receipts for the remaining August issues of American Telephone Journal have since that time also been forwarded to the Association President.) They were accompanied by the following letter, mailed within two hours of the receipt of Mr. Ihmsen's request:

"Answering your favor of the 19th asking for a certified copy of the Post Office receipts of AMERICAN TELEPHONE JOURNAL for the second week in August, we beg to hand you herewith the ORIGINAL post office receipts for our issues of August 3d, 10th and 17th. The original Post Office receipts for the issues of August 24th and 31st will be forwarded to you as soon as received by us.

"Canadian and Foreign circulation IS STAMPED. Our PAID circulation is 4,643.

"The AMERICAN TELEPHONE JOURNAL heartily endorses the policy of your association in seeking information as to the circulation of the telephone press. If any other information on the subject of circulation is desired, the writer will take it as a favor to be asked to attend your next meeting.

"AMERICAN TELEPHONE JOURNAL.
(Signed) "W. H. McDonough, Pres't."

In response to this letter we were in receipt of the following acknowledgment:

"The writer begs to acknowledge your esteemed favor of the 21st inst. enclosing post office receipts as stated.

"The members will be pleased to learn that you favored their desire for a wider knowledge of conditions as they exist, and I wish to thank you personally for your prompt reply.

(Signed) "J. G. IHMSEN,
President, Telephone Manufacturers' Association."

The Post Office receipts forwarded to Mr. Ihmsen showed that the copies of AMERICAN TELEPHONE JOURNAL mailed to readers in the United States and Mexico during the month of August weighed 8,112 pounds, or over 4 tons.

Each copy of the JOURNAL with WRAPPER weighs on an average 4.8 ounces.

So that the POST OFFICE RECEIPTS forwarded to Mr. Ihmsen show that 27,040 copies of the Journal were mailed during August to readers in the United States, its possessions and Mexico.

This circulation is GUARANTEED BY THE UNITED STATES GOVERNMENT.

But in addition, the publishers have forwarded to Mr. Ihmsen a certified statement from AMERICAN TELEPHONE JOURNAL'S printer and also from a public accountant.

Copies of the Journal mailed, with stamps affixed, during August to readers in Canada and other foreign countries, and sales to news companies, brings the actual circulation of the Journal up to the splendid total of 30,244 copies.

This is why the following line will appear regularly on the front cover of the Journal:

THE CIRCULATION OF AMERICAN TELEPHONE JOURNAL IS GREATER THAN THE COMBINED CIRCULATION OF ALL OTHER TELEPHONE PAPERS IN THE WORLD

WARNING TO ADVERTISERS

The Telephone Manufacturers' Association asked for circulation figures for the month of AUGUST.

It did not say anything about September or last January or next December.

The resolution and Mr. Ihmsen's request came without warning to any of the telephone publications. The figures given by American Telephone Journal show its AVERAGE CIRCULATION AND NOT A SPECIAL CIRCULATION MANUFACTURED FOR A SPECIAL PURPOSE AND GOTTEN UP AFTER THE PUBLISHER HAD A CHANCE TO PREPARE FIGURES.

Insist on Seeing the Figures for the Month of August

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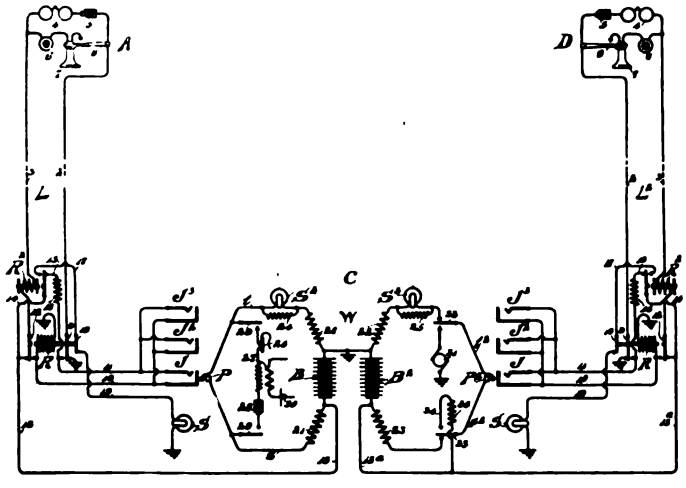
Last Week's Telephone Patents

TELEPHONE SYSTEM.

W. W. Dean, Chicago, Ill., patent (No. 866,266, dated September 17th, 1907; application filed June 19th, 1903; serial No. 162,199; renewed February 27th, 1907; serial No. 359,612) and assigns to Kellogg Switchboard & Supply Company, Chicago.

This patent describes improvements in common battery systems, with particular reference to the supervisory signaling system associated with a cord circuit. In this system the relays and similar devices are eliminated, and the supervisory lamp is placed directly in one side of the cord circuit. A suitable arrangement is inserted in the line circuit, whereby the flow of current for the operation of the supervisory signals is governed.

In the tip strand t of the answering plug of the cord circuit is located supervisory lamp S^2, which is shunted by the non-inductive resistance 24, and a similar supervisory signal S^3, shunted by non-inductive resistance 25 is located in the tip strand t^2 connected with the calling plug. Upon the removal of the calling subscriber's receiver from the hook, and corresponding showing of the signal at central office, the operator inserts her listening plug P in the subscriber's jack. The insertion of the plug completes path for current from battery B over sleeve strand s of the cord circuit and over conductor 10, through winding of

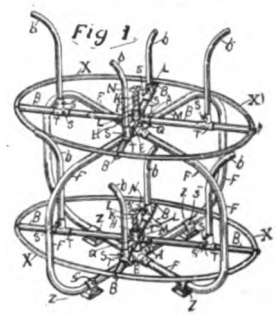


cut-off relay R to ground. The operation of this relay R opens, through its contact 18, local circuit of line signal S, thus extinguishing it and causing current to flow from battery B over both sides of the metallic line and both sides of the cord circuit. Signal S^2, together with its shunt, is so adjusted as not to be operated by the current in this metallic path, and therefore remains inoperative. Upon inserting the plug P^2 in the called subscriber's jack the supervisory signal S^3 is operated, the path of the current being over conductor 13a, branch conductor 14, contacts of line relay R^2, conductor 15, resistance 16, conductors 11 and t^2 to other pole of battery B^2. Upon the response of the called subscriber battery B opens line relay R^2, which in thus operating opens local circuits of the supervisory signal S^3, thus indicating to the operator that the desired subscriber has responded.

WIRE PAY-OUT REEL.

John P. Delphey, Toledo, O., patents (No. 865,482, dated September 10th, 1907; filed April 8th, 1904; serial No. 202,266).

This patent describes a double pay-out reel for use in stringing telephone wires, which is made of a number of U-shaped parts F, which are clamped together at their extremities by the connecting sections E E. The connecting sections E E have mounted upon them an upright standard K for the support of the reel proper X, upon which are mounted wire retaining arms b. Bases



Z are adapted to rest upon a supporting base, or to be attached to carrying handles. The object of the inventor in constructing this form of pay-out reel is to secure a strong, durable, inexpensive, light frame for a combination of two wire pay-out reels that will occupy but little space, be convenient to handle and move about, simple and economical in its construction, and will not easily get out of order.

TELEPHONE SYSTEM.

Henry F. Joeckel, Clayton, Ill., patent (No. 866,138, dated September 17th, 1907, application filed February 23d, 1904; serial No. 194,948, renewed March 11, 1907, serial No. 361,833).

This system involves the use of two line wires and a ground connection, or three line wires, together with the circuits of the instruments, in such manner as to separate the talking and signaling circuits of the instruments one from the other, thus avoiding interference between the two. In this system, which is designed particularly for party line service, the generator and ringer of the telephone are connected in the usual way, that is, either series or bridged from one of the line wires to the ground or the third line wire. The talking circuit, consisting of the receiver, transmitter, induction coil and batteries, is connected in the usual way from the other end of the line wires to the ground or third wire, thus avoiding, so states the inventor, all possibility of interference between the two circuits.

TELEPHONE MOUTH PIECE.

Rudolf Knoll, Vienna, Austria-Hungary, patent (No. 866,036, dated September 17th, 1907; filed August 11th, 1905; serial No. 273,808).

This patent describes a mouth piece for telephones of a form which can be readily removed and replaced when desired. The mouth piece, which is of the type used with breast transmitters, is mounted upon the transmitter proper with a swivel joint, so that it may be rotated to any desired elevation. The transmitter face plate is provided with an annular flange, over which spring tongues of the mouth piece engage, providing a means of attachment for the latter.

RECEIVER DIAPHRAGMS.—(923.)

(*Continued from page 208.*)

Ferrotype iron is simply soft sheet iron of large magnetic tendencies, having a coating of japan applied to one side, and a coating of varnish to the other. The side bearing the coat of varnish is the one usually placed next to the pole pieces of the electro magnets. It is usually purchased in large sheets of the required thickness and stamped out to the correct size by the different manufacturers.

C. B. RECEIVER CLICK.—(924.)

Our subscribers complain very bitterly about getting a "bang in the ear" every time a connection is put up on our local board. I thoroughly understand the cause of this annoyance, but thus far have been unable to find a remedy. I have noticed that the Bell in this town is not so much annoyed by this particular trouble, and if they can overcome it I cannot see any reason why we should not be able to do so as well. M. W. M.

In your case the trouble is caused principally by a reversal of the polarity of the battery when the operator inserts the plug in the answering jack; the tip of the plug striking the ring of the jack and the ring of the plug striking the sleeve of the jack.

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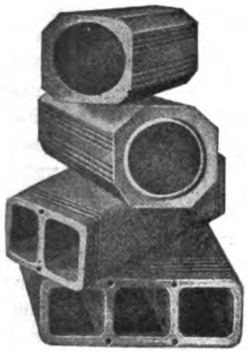
IRONITE

IRONITE **Duplex Drop Wire** IRONITE

Is designed to meet all of the requirements of perfect service, manufactured in accordance with standard specifications for drop wire and is GUARANTEED to meet the standard insulation tests. It is as flexible as hard drawn copper and WILL NOT STRETCH.

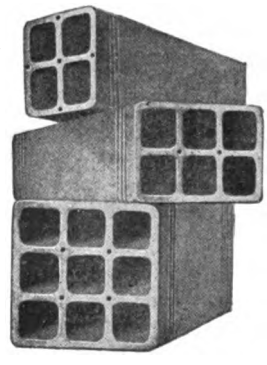
Saving effected by use of Ironite—Fifty Dollars per mile. Write to-day for sample and prices.

Durant Electric Supplies Co., 52 FIFTH AVE., CHICAGO



VITRIFIED

CLAY CONDUIT



SINGLE and MULTIPLE DUCT

IMMEDIATE DELIVERY ON ALL STANDARD SIZES

Factories: New Jersey, Pennsylvania, Ohio

Standard Vitrified Conduit Company

Main Offices: 39-41 CORTLANDT ST., NEW YORK, N. Y.

Do you want the best wire to be obtained for Telephone Service?

Use Roebling Hard Drawn Copper Wire

Do you want a cheaper wire which will last for years and give good service on lines of ordinary length?

Use Roebling Double Galvanized Telephone Wire

John A. Roebling's Sons Co., Trenton, N. J.

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With the Manufacturers

"FRIDAY, THE THIRTEENTH."

SEPTEMBER 13 happened to be Friday, but the Stromberg-Carlson Tel. Mfg. Co. is able to say that it weathered any unlucky influences which surround this day burdened with the double symbol of misfortune. The company reports sales on that day mounting up to more than thirteen thousand dollars.

Among the first-class orders received was one for a generator call switchboard and 100 telephones for Panama, Florida; a big one for two cars paper and leaded cable from Waco, Texas, and a magnet wire order for Westinghouse amounting to $4,000.

Other orders received to date are for a 300 line central energy multiple equipment and 300 telephones for Hood River, Oregon; 190 telephones for Toledo, Ohio; a two position generator call visual board for St. James, Minnesota; a switchboard arrester equipment and cable for Jersey City, N. J.; a central energy switchboard, 100 telephones for Essex & Coos Telephone Company, N. H.

GRAY TELEPHONE PAY STATION COMPANY, Hartford, Conn., shows in its latest catalogue pay stations adapted to every conceivable location, arranged for use with any of the standard types of telephones. Some of the special types which have been most recently developed are the portable sets containing switch hook mechanism and terminals which permit of the mounting of transmitter and receiver directly upon the pay station case. Another type of pay station which has shown itself to be a money maker in several cities is the street pay station which has a well constructed iron enclosing box mounted upon a solid post, so that it may be set up at corners and other out-of-door locations.

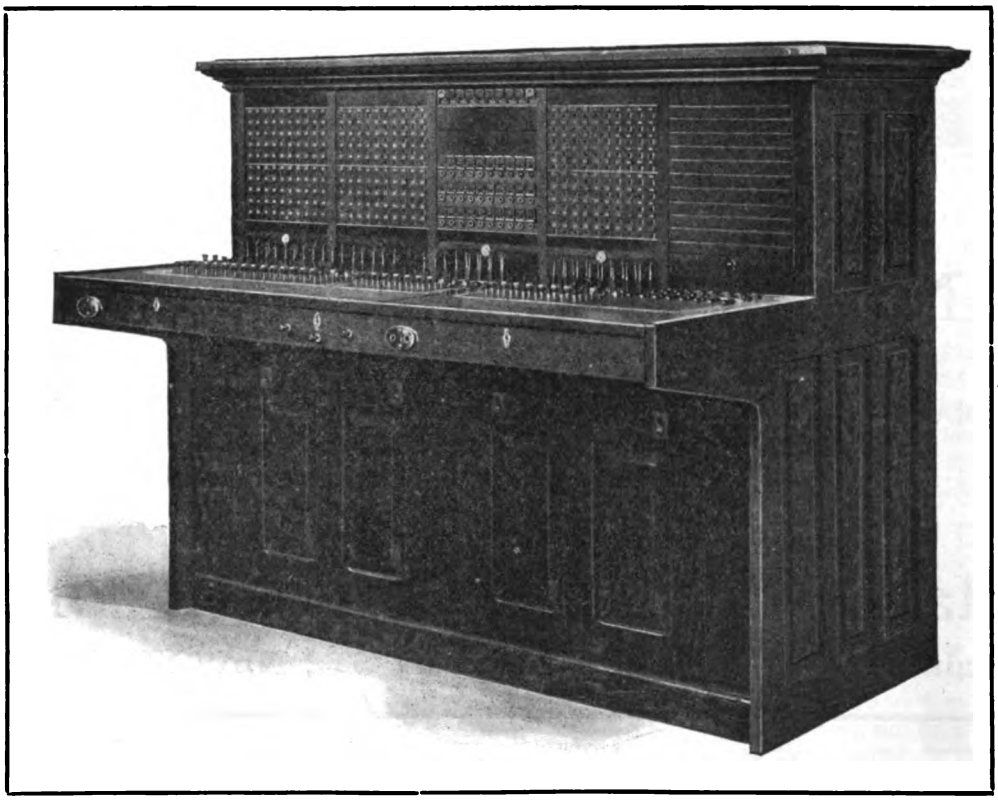

Fig. 1. Special single section common battery switchboard with capacity for four hundred subscribers' and fifty toll lines. Manufactured by Dean Electric Co.

F. BISSELL CO., Toledo, O., devotes a special catalogue to information about torches suitable for use by linemen, cablemen and other employees of telephone companies. A large variety is listed and special information about each type is given to aid purchasers in making a selection of the instrument which will best satisfy their particular requirements.

THE GLOBE EAR-PHONE COMPANY, 395 Washington street, Boston, Mass., manufactures a telephone device for aiding deaf persons in conversation which embodies a number of interesting points of convenience. It seems to have been thoroughly demonstrated that the telephone is an entirely practical aid to the hearing of deaf persons, and so the company has combined a neatly designed set of light-weight instruments, including a small watch case receiver attached to a head band, transmitter and battery, in such a form that they may be conveniently carried about. The advantage of the use of these instruments is that persons may carry on a conversation when separated by a distance of several feet, and the inconvenience arising from the use of the instruments is very trifling. Talking sets of different styles and sizes, and also of various strengths, are manufactured. One of the interesting developments is a special set designed to enable deaf persons to hear words spoken at considerable distances, and thus adapted for use in theatres, lecture rooms, etc. The company will be pleased to send full information showing the effectiveness of this device, and also concerning various points in connection with its use or sale which may be desired by interested persons.

STERLING ELECTRIC COMPANY, Lafayette, Ind., shows pictures of some good looking telephones in a folder which is being distributed among its customers. Views are given of instruments adapted to every class of service, both magneto and common battery, and they bring out in an excellent way the distinguishing points of Sterling design which give this apparatus its individuality. This folder is in a convenient form for those who wish to have views of all the several types of instruments manufactured by the company to show subscribers, or for their own information, as a means of comparison of the appearance of these instruments with those of other manufacturers. Folders and full information concerning any particular points in relation to the construction of any special type of instrument will be cheerfully sent by the Sterling Electric Company to telephone managers and other interested persons upon receipt of a request for this information.

A COMMON BATTERY SWITCHBOARD WITH NON-MULTIPLE CIRCUIT.

THE demand for a common battery switchboard of but comparatively small capacity, to include adequate toll facilities in such a way that terminals will be conveniently located, has been met by the Dean Electric Company, of Elyria, O., through the equipment of a standard toll section with four hundred non-multiple circuits, as shown in the accompanying illustration, and the addition in the center panel of a bank of fifty toll jacks with a separate key shelf. Each of the first, second, fourth and fifth panels provides space for one hundred common battery lines, with eight cord circuits in front of each panel.

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THE CALCULAGRAPH

PAYS FOR ITSELF

As has been demonstrated in hundreds of instances by well known telephone managers. The saving by reason of all overtime use of lines being charged for, alone pays for the Calculagraph in a very short time.

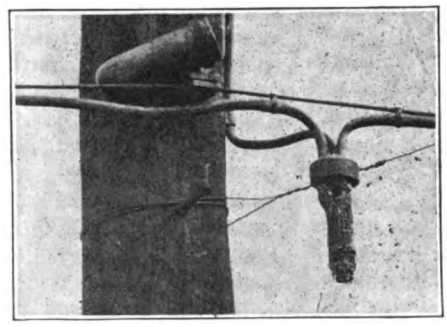
IT MAKES NO CLERICAL ERRORS

Get Our Reason Why Booklets.

CALCULAGRAPH COMPANY

1437 JEWELERS BLDG., NEW YORK CITY

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.



MAKING TESTS IN TELEPHONE CABLES

WHERE HARGIS JOINTS ARE USED

Take your pair of spanners, unscrew the pot from the ring, unlace the pairs and spread them out like a fan. You can then test any of the pairs with greater ease than you can test pairs on the outside layer of a Horizontal Wiped Joint. When test or repair is finished, all that you have to do is to screw the pot on to the ring and tighten with a pair of spanners, and you have a perfect moisture-proof joint. It is not necessary to drag the cable platform, block and tackle, below torch, etc., from one joint to another.

The expense of a groundman can be eliminated when looking for trouble or making tests when Hargis Joints are used. These are only a few reasons which demonstrate the advantages of the Hargis Cable Splicing Joint.

If you are considering new cable construction or wish to change your Horizontal Wiped Joints to Hargis Joints, on account of their convenience, write us to-day. You will save time and money. You will improve your cable construction.

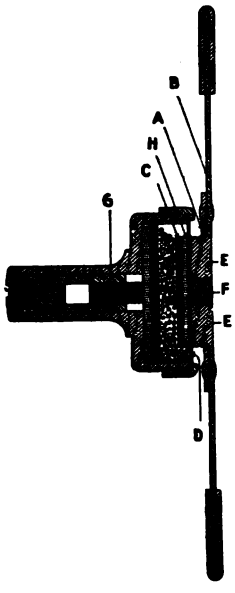
W. N. MATTHEWS & BROTHER

Manufacturers of Patented Specialties

214 N. 2d St., St. Louis, Mo.

Branches: New York, San Francisco

Think of This



The terminal supports of the front electrode, EE and F and A, are of aluminum, having but 1-5th the weight, therefore offer but 1-5th the inertia offered by the brass nuts, screws and lugs, performing the same functions in other transmitters.

With but 1-5th the inertia for the sound waves to overcome, is it not reasonable to suppose that this transmitter is more sensitive and will reproduce the timbre and quality of the voice more accurately than any other? To prove that it does, we will send you one on thirty days' approval, and if not satisfied, you may return it at our expense.

May we send one?

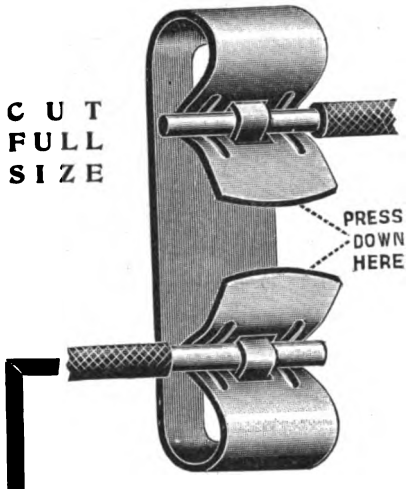
Long Distance Telephone Mfg. Co.

Makers of "Better" Telephones

SOUTH BEND, INDIANA

FAHNESTOCK

CUT FULL SIZE



TEST OPENER

made of finest

COPPER BRONZE SPRING METAL

for connecting

IRON to COPPER
IRON to IRON
COPPER to COPPER

No Nuts to Corrode. **No Threads to Strip**

Positive Connection Always. Will Not Injure Hard-drawn Copper. Line Can Be Opened at any time Without Tools

Superior in every way to the old style test connector with its nuts to corrode and that after six months of use cannot be removed excepting by the use of tools.

FAHNESTOCK ELECTRIC CO.

129 Patchen Ave., Brooklyn, N. Y.

Demand Fahnestock Clips on your Dry Batteries

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With the Manufacturers

This style of board was originally designed to meet the requirements of the Grafton, West Va., exchange of the Consolidated Telephone Company, and it has proven so satisfactory in service that the manufacturers are standardizing the type. While the same cabinet has been used in many instances as a standard toll section, the arrangement of equipment as outlined above is a comparatively new departure.

The small illustration shows the same style of cabinet equipped as a toll section for the Citizens' Telephone Company of Racine, Wisconsin, and installed some two years ago. Remove from this board the book stalls and pigeon holes on either side, both above and below the key shelf, substitute toll key and cord panels in the place of the calculagraph and this board becomes like the new common battery type. This new style may be enlarged by removing the end boards, installing adjoining sections and rewiring for multiple circuits, since it is provided with multiple cable supports. This great flexibility in service and in providing for future needs is an advantage which will be most readily appreciated.

FRANK B. COOK, 246 W. Lake street, Chicago, Ill., has prepared a special folder giving, in a very attractive manner, information concerning the several types of sub-station protectors which he manufactures. The line comprises devices adapted to cover every type of location, and all practical service conditions. Mr. Cook will be pleased to send this folder to all persons requesting information.

S. D. LEVINGS TO BUILD NEW PLANT AT HOUSTON, TEXAS.

THE Independent telephone field has recently acquired a new recruit in the person of Mr. S. D. Levings, who has been for the past three years assistant to the construction engineer for the Chicago Telephone Company. Mr. Levings has recently severed his connection with the Bell concern to accept a position as a constructing engineer for the well known firm of McMeen & Miller of Chicago.

Messrs. McMeen and Miller have recently acquired the contract for engineering and constructing an entire new exchange system in Houston, Texas, where they have detailed Mr. Levings as engineer-in-chief. Mr. Levings will follow the most up-to-date principles in the design of the Houston plant.

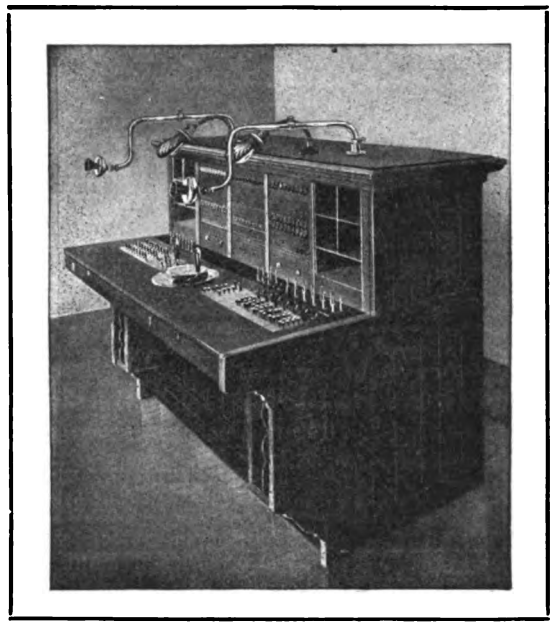

Fig. 2. Same style of cabinet shown in Fig. 1, but equipped for toll business only.

ELECTRIC SERVICE SUPPLIES COMPANY, Chicago, Ill., always carries in stock, ready for immediate delivery, a full line of tools used in handling and erecting telephone poles. These include the best grades of shovels, spoons, pole supports, cant-hooks and carrying hooks. It lists all this material with prices in a catalogue which will be sent to managers and construction superintendents upon receipt of a request.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., devotes a special ten-page folder, recently issued, to dry battery types of telephones. The apparatus used in these instruments is of the company's latest designs, so that these telephones may be expected to give excellent results. One of the especially interesting types illustrated is the "Central Energy" style wall telephone, which is extremely compact, with all apparatus rendered very easy of access by being mounted upon the back board, with the sole exception of the ringer. The enclosing case may be brought forward easily to permit access to the interior of the instrument. The company's folder gives complete detailed information and may be obtained upon request.

LAST MONTH'S COPPER PRICES.

TELEPHONE men ought to be more interested in the prices of copper just at the present time than in almost any other feature of the general trade situation which affects their business. *Copper Gossip*, published by the National Conduit and Cable Company, 41 Park Row, New York, is especially interesting in the September 20 issue, which is now being distributed. It shows the sudden drop in the price of the metal which took place September 3 and other reductions which subsequently took place which brought the price down to 16⅝ for Lake copper and 16½ for electrolytic copper on September 16, as compared with 19⅛ and 19 on September 17, 1907. Very interesting information concerning the general copper situation is given in this month's issue, which will be sent free of charge to all interested managers of telephone companies who send their names with a request to be placed on the company's mailing list.

W. N. MATTHEWS & BRO., 214 N. Second street, St. Louis, Mo., are distributing some very interesting information about their Hargis cable splicing joints. Many claims have been made for this device as a time and money saver in cable work, as many of its users state that they have been able to make perfectly satitsfactory joints without any great amount of experience in handling lead cables, and that it has saved the trouble and expense of bringing cable splicers from outside or running the risk of having a local plumber do the work.

It is interesting to note that some telephone men at first objected to its vertical position on aerial work. Its manufacturers, however, point out that this position is of decided advantage, as it facilitates the splicing, boiling out and inspection of conductors, and makes pouring of solder to complete a joint very simple.

THE UNIVERSAL CABLE GRIP COMPANY, Syracuse, N. Y., makes strong claims for the adaptability of the Universal cable grips to practical service conditions. Their use appears to present several very important advantages over the old fashioned Marlin sling. Attachment can be made very quickly, and no portion of the cable is injured, so that economy in two directions at the same time is the result of their use. The company will be pleased to give operating companies, interested, an opportunity of testing the merits of these grips.

THE BELDEN MANUFACTURING COMPANY, 194 Michigan street, Chicago, Ill., is asking for specifications for cords from telephone operating companies. It believes it is able to meet the most exacting requirements which can be reasonably imposed as a means of securing a cord best adapted to actual service conditions, and has taken this way of getting in touch with men operating telephone exchanges who are not already on its large list of customers.

MR. E. A. VROOMAN, of Schenectady, N. Y., has just assumed the duties of advertising manager of the L. M. Ericsson Telephone Manufacturing Company, Military Road, Buffalo, N. Y. Mr. Vrooman is well known throughout the East as an able manager of general publicity.

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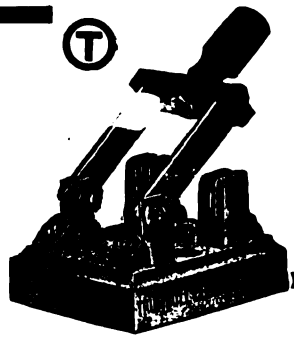
TRUMBULL TELEPHONE SWITCHES



PRICE GREATLY REDUCED

CAT. No.		LIST	STD. PKG.
707	S.P.S.T.	$ .20	150
708	S.P.D.T.	.32	100
709	D.P.S.T.	.35	100
710	D.P.D.T.	.50	50

SUBJECT TO YOUR REGULAR DISCOUNTS

WRITE FOR BULLETIN

SELF-ADJUSTING CLIPS HELD FIRMLY IN RECESSES IN THE BASE INSURE A PROPER ALIGNMENT

SELECTED PORCELAIN USED EACH SWITCH INSPECTED

THE TRUMBULL ELECTRIC MFG. CO.

NEW YORK 136 LIBERTY ST. PLAINVILLE, CONN. BOSTON 65-67 OLIVER ST.

Easophones — The WIRE & TELEPHONE COMPANY of AMERICA, ROME, N.Y.

For MAGNETO AND Central Energy Systems

Ideal for Offices, Homes, Hotels, Factories

Mr. Exchange Manager:—One of your brother managers was not inclined to comply with the subscriber's request for Easophones. He feared that this would add a third set to the stock of spare parts he had to carry for his two types of instruments in service. Was this the case? **No,** it was not. After a thorough examination of the details of design and construction of the **Easophones,** he saw there would be no need for carrying spare parts, and he saw, **too,** a **reduction** in **maintenance expense** due to the saving of the "**troubleman's**" time, since this would be

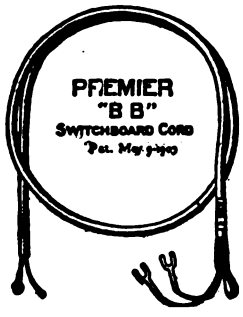
THE ONE TYPE OF PHONE NEVER IN TROUBLE

Consequently! The Subscriber got the **Easophones.**
One was put in his **office,** the other in his **bedroom.**
He was **proud** of his **Easophones.**
He showed them to his friends.
The **demand** was thus **created.**
The manager reaped the harvest.
The **increase** in **revenue** from **additional** subscriber's stations followed.
History repeated itself.
The manager told other managers,
and now
The Easophone is the best contract agent in the business.

THE WIRE AND TELEPHONE COMPANY OF AMERICA, Rome, N.Y.

Manufacturers of Telephones, Telephone Supplies, Bare Copper and Magnet Wire

ONE OF OUR SPECIALTIES



The Cord That Lasts

Write for Sample

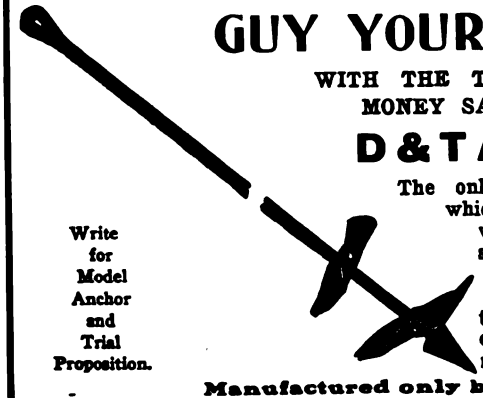
CORDS, Cables and Wires for telephone purposes. Right prices and prompt deliveries. Before placing your next order for switchboard cords secure our NEW PRICES on the **Premier BB** steel wire cord. Best and most economical switchboard cord on the market. ∴ ∴ ∴ ∴

Premier Electric Co., 141 South Clinton St., Chicago, Ill.

GUY YOUR POLES

WITH THE TIME AND MONEY SAVING

D & T ANCHOR



The only patent anchor which is installed without the aid of special tools.

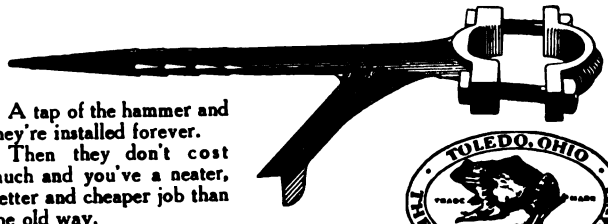
Just drive and twist. Installed by one man in one minute.

Write for Model Anchor and Trial Proposition.

Manufactured only by

THE VOTE-BERGER CO., La Crosse, Wis.

THE SECURITY POT HEAD BRACKET means PERMANENT INSTALLATION. THAT'S WHY THEY'RE A GOOD INVESTMENT.



A tap of the hammer and they're installed forever.

Then they don't cost much and you've a neater, better and cheaper job than the old way.

TOLEDO, OHIO — THE F. BISSELL COMPANY

Get Booklet Number Three. It tells.

THE F. BISSELL COMPANY, TOLEDO, O.

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News Notes That Are New

NEW COMPANIES.

MONTROSE, COLO.—A new Independent telephone company is being formed by the citizens of Horsefly, whose object is to build a line from Montrose to that city, a distance of about twenty-three miles. Connections are to be established with the Montrose system, and lines will eventually be built to Norwood. The capital stock is given as $750, and among those interested in the project is L. J. Finch.

CLAYTON, ILL.—The Clayton Farmers' Union Telephone Company has been incorporated with a capital stock of $1,000. Among the incorporators are John W. Wallace, Charles C. Cain and Henry J. Beckman, Sr.

SYCAMORE, ILL.—Articles of incorporation have been filed by the Farmers' Exchange Telephone Company, and the entire amount of its capital stock $25,000 has been subscribed. Its charter provides for the construction and operation of a telephone system in all that portion of De Kalb county north of the C. and I. Railway, and connections south of the C. and I. Railway are to be established with the Sandwich line. J. F. Winchester, of Sycamore, and W. P. Bean, of Waterman, have been active in the organization of this company.

TOCOWA, MISS.—An Independent telephone company, which has for its object the construction of a telephone system to connect Tocowa with Sumner, Charleston, Enid, Courtland and Pope, has been organized at this city. Among those interested in the new enterprise are E. R. Turner and D. Goodwin, who already operate lines covering the greater part of Tallahatchie county.

OMAHA, NEB.—Plans are under way for the organization of a $1,500,000 Independent long distance telephone company, with headquarters at Omaha, Neb. It is expected that its lines will cover portions of the states of Nebraska, Iowa, Missouri and Kansas. The control of the new company will practically be in the hands of the men in charge of the New State Telephone Company, of Sioux City, Ia., namely, Charles G. Cockerill, president; C. H. Smith, secretary and manager; M. M. Read, treasurer; P. C. Cockerill, superintendent. F. H. Stow, vice president of the Independent Telephone Co., of Omaha, is also to be associated with the company.

SALISBURY, N. C.—An Independent telephone company is being formed at this city, and a franchise is to be applied for. It expects to construct and maintain a long distance line connecting High Point, Statesville and Concord, and all points between these three towns. Connections are also to be established with Lexington, Linwood, Thomasville, Spencer, China Grove, Randleman, Troy, Taylorsville, Mooresville, Asheboro, Kanapolis, Landis, Mt. Pleasant and other points.

STOKESDALE, N. C.—The Goodwill Telephone Company has been incorporated to construct a telephone line from Stokesdale to Belew's Creek, Kernersville and other points. It has an authorized capital stock of $2,000, and the incorporators are Geo. M. Teague and others.

KENMARE, N. D.—Articles of incorporation have been filed by the Greaves Telephone Company, of Kenmare. It has an authorized capital stock of $150,000, and the incorporators are G. W. Greaves, Q. Richards, both of Kenmare; P. Johnson, Donnybrook, and J. J. Greaves, of Glencoe, Minnesota.

LEEDS, N. D.—The Star Line Telephone Company, of Leeds, has filed articles of incorporation. The capital stock is placed at $5,000, and the incorporators are S. Saunders, J. M. Fox and W. Conway, all of Leeds.

HINTON, OKLA.—The Highland Telephone Company, of Hinton, has been incorporated with a capital stock of $3,600. Among the incorporators are Martin V. Nutt, Daniel R. Baysinger and C. G. Nash.

KORN, OKLA.—Among the newly organized Independent telephone companies is the German Telephone Company, of Korn. The capital stock is placed at $1,500, and the incorporators are P. F. Kliewer, P. F. Fransen, H. H. Dyck, John Balzer, P. L. Heidebrecht, George Sawatzky and C. F. Nikkel.

SHATTUCK, OKLA.—Among the newly incorporated telephone companies is the Northwestern Telephone Company, of Shattuck. It has a capital stock of $15,000, and the following directors have been elected: S. H. James, D. R. James, O. H. James, W. H. Springfield and F. C. Darr.

PORTLAND, TENN.—On account of the poor service being rendered by the Cumberland Telephone (Bell) Company, an Independent telephone company, to be known as the Sumner County Telephone Company, is being organized. About sixty shares of stock of the par value of $25 per share have been subscribed, and work on the system is to be commenced at once. The company expects to connect its exchange with the Home companies in surrounding counties.

ROANOKE, VA.—Articles of incorporation have been filed by the Roanoke County Telephone Company, and the following officers elected: Monroe Grast, president; J. B. Andrews, vice-president; W. H. Moomaw, secretary and treasurer; T. L. Ininger, manager, all of Roanoke, Va. Its capital stock is given as $5,000 maximum, and $250 minimum.

FRANCHISES.

KINGSTON, ILL.—The Boone County Rural Telephone Company, of Belvidere, of which Frank W. Plane is manager, has been granted a franchise to extend its lines to Kingston.

LOUISVILLE, KY.—Application for a new franchise to operate in this city is to be again made by the Home Telephone Company, the former application having lapsed with the expiration of the terms of office of the council before which it was made.

HOLLY, MICH.—Application for a franchise in Holly has been made by the Inter-State Telephone Company.

MOUNT VERNON, N. Y.—A new application for a franchise has been filed at this city by the State Line Telephone Company.

CINCINNATI, O.—The renewal of permission to place wires for which it applied some days ago has been granted to the Fitzsimmons Independent Telephone Company.

FINANCIAL.

REDLANDS, CAL.—The stockholders of the Southwestern Home Telephone Company, Redlands, have authorized the creating of a bonded indebtedness of $1,000,000. Of this $100,000 is to be used in liquidating the obligations of the company, and the remainder is to be used for further extensions and improvements. It now has exchanges in Banning, Armada, Hemet, San Jacinto, Perris, Elsinore and Temecula.

CRESTON, ILL.—The capital stock of the Tri-County Mutual Telephone Company has been increased from $2,500 to $6,000.

GRAND RAPIDS, MICH.—At a recent meeting of the stockholders of the Citizens' Tele[illegible] Company it was decided to increase the capital stock from $3,000,000 to $3,500,000, the increase to be used in the extension of the company's plant.

ELECTIONS.

HILLSBORO, ILL.—The following directors have elected by the Mutual Telephone Company, of Hillsboro: B. A. Stead, George D. Taylor, R. P. Barnard and Wm. Seymour.

RAYMOND, ME.—The following officers and directors have been elected by the Raymond & Webbs Mills Telephone Company: President, L. N. Jordan; treasurer, F. H. Witham; directors, C. S. Jordan, E. L. Skillin and C. K. Thorpe.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company has elected the following directors: C. F. Rood, E. B. Fisher, Philip Graham, Lester J. Rindge, Gaius W. Perkins, Joseph B. Ware, Edward Fitz Gerald, William J. Stuart, Cyrus E. Perkins, Robert D. Graham and John B. Martin, who succeeds E. G. Studley.

ALBANY, N. Y.—The stockholders of the United Message Company have elected the following directors: Samuel B. Rawson, Irving H. Griswold, E. F. Allen, Theodore M. Brush, Frederick H. Sudro, Everett E. Williams, Elyria, Ohio; Albert Hessberg, E. M. Woodard, E. B. Toedt, Albany; William C. Geer, Peter McCarthy, Troy; Eugene Walrath, George D. Smith, Little Falls; James J. Mahoney, Niagara Falls; J. M. Andrews, Schenectady; Fred W. Kavanaugh, Waterford; B. G. Higley, Sandy Hill; Howard Hendrickson, Albany; H. C. Hequemberg, New York; F. E. Griffin, W. B. Harris, Albany; inspectors of election, Irving R. Coughry, P. J. Fitzgerald.

CAMBRIDGE SPRINGS, PA.—The officers of the Cambridge Springs Electric Telephone & Telegraph Company are: D. E. Kelly, president; C. W. Jones, secretary and manager; A. H. Matteson, treasurer. Directors, D. E. Kelly, C. W. Jones, A. H. Matteson, Otto Kohler and Fenton King.

RICE LAKE, WIS.—The newly elected officers of the Rice Lake & Northeastern Telephone Company are president, W. H. Bundey; secretary and manager, J. E. Horsman; treasurer, E. J. Everts.

COMBINATIONS.

GREENVIEW, ILL.—The stock of the Middletown Mutual Telephone Company has been purchased by Frank Marbold, and he contemplates the installation of a [illegible]tly first class telephone system.

KANAWI[illegible]. —Arrangements have been made by the Norway

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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National Pole Company

SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from
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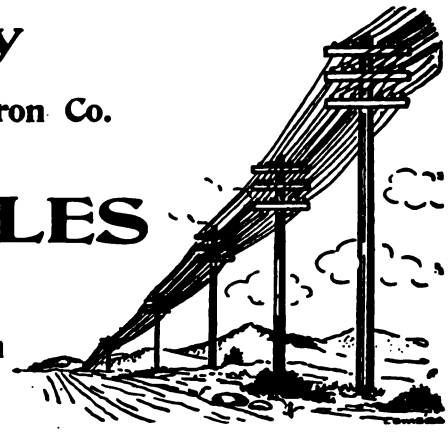

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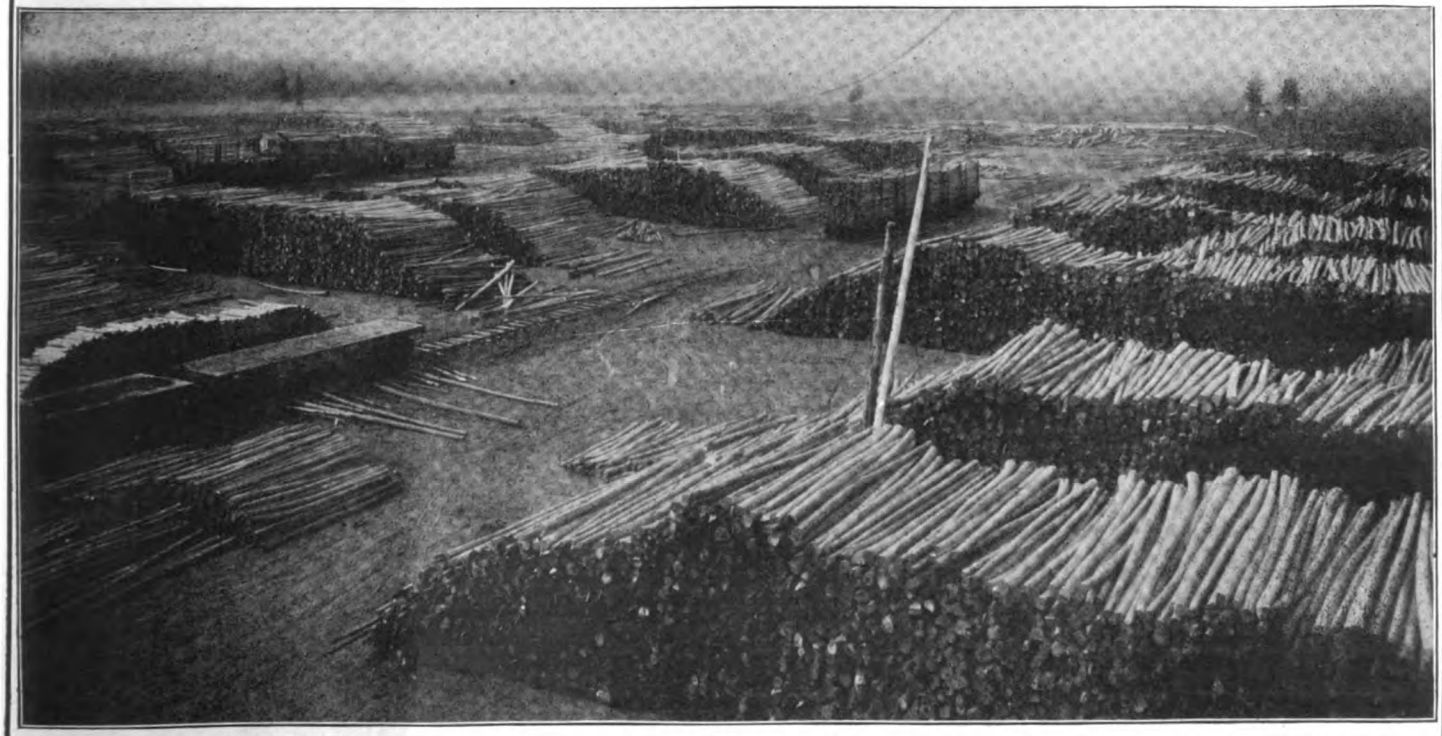

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News Notes That Are New

Rural Telephone Company with the Hancock County Rural Telephone Company for connections at Kanawha, which will insure an extended service for both companies.

BEVIER, MO.—The stock formerly owned by L. F. Coulter in the Bevier Telephone Company has been acquired by a number of local business men. The system, which is to be run under the same name, is to be materially improved.

CANONSBURG, PA.—It is quite likely that the Pittsburg and Allegheny Telephone Company will purchase the pole line from Canonsburg to McDonald, owned by the Federal Telephone Company.

CASHTON, WIS.—The Hall and Steel local telephone exchange has been acquired by C. E. Kramer, whose intention it is to make extensive improvements in this system.

DELAVAN, WIS.—The principal interest in the Walworth County Telephone Company, formerly owned by L. Hackney, has become the property of the Independent Telephone Company of Milwaukee, and the plant is to be materially improved.

MENOMONEE FALLS, WIS.—The Menomonee Falls Telephone Company has purchased the Richfield, Menomonee and Holy Hill Telephone Company's lines.

MISCELLANEOUS.

SAN FRANCISCO, CAL.—The Direct Line Telephone Company, of San Francisco, which was organized some time ago, has filed articles of incorporation in New Jersey. It has a capital stock of $1,000,000, divided into shares of $100 each, and it will commence business with $500,000. The incorporators are A. Koch Andriano, of San Francisco, who holds 4,998 shares, and John A. Potter and Charles W. Smith, of New York.

NEW LONDON, WIS.—The name of the farmers' telephone company, organized recently at this city, is the Caledonia Telephone Company. It has a capital stock of $1,500, and the following officers have been elected: Fred Fergot, president; William Morian, vice-president; F. C. Krueger, secretary; August Schempke, treasurer. Construction work on a line between Mukwa and New London is to be commenced at once.

PERSONAL.

HENRY C. LARRABEE, formerly a well-known member of the installing staff of the Dean Electric Company and more recently connected with the United States Signal Service as assistant electrical engineer, was married on September 25 to Miss Marion Perkins at Woodfords, Me.

M. B. OVERLY, general manager of the Central Home Telephone Company, the Independent Long Distance Telephone and Telegraph Company, and the Long Distance Telephone and Telegraph Company of Louisville, Ky., has tendered his resignation to go into effect October 1, 1907. Mr. Overly will remove to Cleveland, Ohio, where he has other business interests.

L. G. PARKER, who has been auditor of the Central Home Telephone Company, will succeed Mr. Overly as general manager.

H. E. SHEELEY, of Three Oaks, Mich., has been appointed manager of the Merchants' Mutual Telephone Company of Michigan City, Ind.

FRED A. WITHERS has recently been appointed manager of the exchange of the Peninsular Telephone Company at Bartow, Fla.

Pushing Ahead

COLUSA, CAL.—The Colusa County Telephone Company, which has just completed a line from Colusa to Williams, is now at work on the construction of the Williams exchange. Six new switchboards are to be installed in the company's various exchanges, a new line built from Colusa to Princeton and the systems extended in various other directions throughout the county.

SAN FRANCISCO, CAL.—Work on the construction of its new exchange building, which is to cost $100,000, has been commenced by the Home Telephone Company.

BOLTON, CONN.—The Bolton & Coventry Telephone Association contemplates the erection of a new line.

FORT MEADE, FLA.—Many extensions in its system are being made by the Fort Meade Telephone Company, of which Mr. Reif is manager.

KENDRICK, IDAHO.—The Interstate Telephone Company is planning for the installation of an entire new system in this city to replace the old one.

HERBERT, ILL.—The lines of the Boone County Rural Telephone Company are to be extended from Herbert to Kingston, and its system otherwise improved.

LONGVIEW, ILL.—The Independent Telephone Company, which has exchanges at Tuscola and other towns in the immediate vicinity, contemplates the erection of a line from Villa Grove to Longview.

COLUMBUS, IND.—Material improvements have been made in the plant of the Citizens Telephone Company at this city, and others are being considered.

GOSHEN, IND.—The Home Telephone Company has decided to expend $35,000 in improvements and equipment which will include a new switchboard. Two years ago the company installed a new switchboard at great expense, but owing to the growth of the system and other reasons the company finds it necessary to replace it with a new equipment.

MADISON, IND.—The Madison Telephone Company is completing a new commodious and modern building in which it will install new equipment. The company will discontinue its servce contract with the Bell Company October 1 and return its transmitters and receivers. The company announces that it is in the market for a complete Independent exchange equipment.

DECORAH, IA.—The Standard Telephone Company, which has been making many improvements in its lines at other points, expects to install a new switchboard at Decorah, and to entirely rebuild its exchange. The extension of its lines throughout the city is also contemplated.

SABETHA, KAS.—Plans are being considered by the Sabetha Mutual Telephone Company for the erection of a line from that city to Seneca.

EUNICE, LA.—Many improvements in its plant at this city are being made by the Sibille Telephone Company, which also intends to build a number of new lines.

MINOT, ME.—The Poland Telephone Company is making many improvements in its system at Minot.

CASSOPOLIS, MICH.—The Cassopolis Telephone Company, which has recently been taken over by the Cass County Home Telephone Company, of Dowagiac, has completed a line from South Porter to Marcellus.

HEMLOCK, MICH.—The exchange of the Union Telephone Company is to undergo many improvements, and the plant of the company in this city is to be made first class in every particular.

PAINESDALE, MICH.—A line from Painesdale to Baltic is being constructed by the Copper Range Consolidated Mining Company.

MONIDA, MONT.—The Centennial Telephone Company, which was incorporated some little time ago with a capital stock of $10,000, has completed its line between Monida and Lakeview. Lines are being constructed in other directions, and long distance connections are to be established with Butte.

OMAHA, NEB.—Work on the installation of its system at this city is being carried on rapidly by the Independent Telephone Company.

HACKETTSTOWN, N. J.—The Hackettstown Telephone & Telegraph Company, whose lines extend to Allamuchy on the north, to Rockport on the west, is constructing a line to German Valley, where connections will be effected with the Morris County Telephone line.

FARGO, N. D.—The new switchboard apparatus of the North Dakota Independent Telephone Company is being installed. It has a capacity for two hundred local telephone lines and thirty toll lines. Connections have been established between Jamestown, Carrington, Fessenden and other points. Excellent progress is being made on the Bismarck exchange, a line is being built from Garrison to Max and Plaza, another between Bismarck and Garrison, and another between Bismarck and Dickinson. Connections have also been established with Pingree and Buchanan through a temporary switchboard at Jamestown.

JOHNSON CITY, TENN.—The Bristol Telephone Company, which has been making extensions in its system at Knoxville, expects also to enlarge its plant in Johnson City.

SEGUIN, TEXAS.—The lines of the Commercial Telephone Company along the Seguin-New Braunfels road are being entirely renovated.

LOOMIS, WASH.—Owing to the poor service being rendered by the Pacific States (Bell) Telephone Company, the citizens of this city are engaged in organizing a local company.

REPUBLIC, WASH.—A line from Republic to Park City is being erected for the benefit of the Colville Mining and Smelting Company.

BARABOO, WIS.—Among the extensions being made by the Baraboo Mutual Telephone Company is the erection of a line southeast of the town, which will afford connections with North Freedom.

RHINELANDER, WIS.—The Mutual Telephone Company expects to install a new switchboard and to otherwise improve its plant.

EDMONTON, ALBERTA, CAN.—Work on the Government lines is progressing very satisfactorily. The system between Lacombe and Stettler is practically completed, and the exchange equipment is soon to be installed; the line between Stettler and Daysland is also well along. Additional lines are being constructed between Edmonton and Lloydminster, Macleod and Blairmore, a number of rural lines are being built, and it is estimated that in all about five hundred miles of line will have been constructed.

UNDERGROUND.

DECORAH, IA.—Over eight thousand feet of cable is to be placed in conduits by the Deleware County Telephone Company in Decorah.

KEOKUK, IA.—The Mississippi Valley Telephone Company expects to place its wires underground in the business portion of Keokuk.

CAMDEN, N. J.—The Eastern Telephone Company is at work on the installation of its conduit system in this city.

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New York's Businesslike Telephone Convention

WHEN the Independent telephone men of New York State came together for their annual convention on September 25th they lost no time in getting down to business and effecting improvements in organization which will make the Association a very material factor in the future development of the telephone business of the State. About 125 delegates, which was a fairly good attendance, assembled at the building of the Independent Telephone Company at Syracuse, where they were welcomed to the city by the Hon. Mr. Sadler, president of the Common Council. A pleasant response was made by George R. Fuller of Rochester. In the absence of Mr. A. H. Cowie, vice-president of the Association and its acting president since the unfortunate death of Dr. Wm. R. Campbell last Spring, Mayor Aitken of Auburn was elected chairman. The Association, by a unanimously adopted resolution, expressed its regret at the death of Dr. Campbell, who, during the portion of his term when he was alive, served the Association faithfully and with ability.

To facilitate the carrying on of the business of the convention, the following committees were immediately appointed: Committee on State Organization—Mr. Potter, Rome; Mr. Wright, Williamsport; Mr. Bellanger, Schenectady. Committee on Affiliation—I. H. Griswold, Albany; Geo. R. Fuller, Rochester; Wilbur H. Johnson, Buffalo. Committee on Nomination—Jno. B. Pierce, Syracuse; Mr. Fluhrer, Auburn; Geo. Otis, Newburgh.

A Legislative Committee was appointed, consisting of Judge Hendrickson, Albany; A. H. Cowie, Syracuse; B. G. Hubbell, Buffalo. These members will serve as a standing committee for the coming year.

New officers, who will serve for the coming year, are: President, I. H. Griswold, Albany; vice-president, Wilbur H. Johnson, Buffalo; secretary, R. Max Eaton, Niagara Falls; treasurer, Geo. R. Fuller, Rochester.

R. M. Eaton, Re-elected Secretary of the New York State Independent Telephone Association.

On motion, the by-laws were amended, to provide for an Executive Committee of six, rather than twelve members. This motion being carried, the following Executive Committee was nominated and elected for the ensuing year: J. T. Bellanger, Schenectady; Geo. B. Wright, Williamsport; Byron L. Moore, Buffalo; Geo. R. Fuller, Rochester; I. H. Griswold, Albany; Wilbur H. Johnson, Buffalo.

The Committee on Affiliation in its report recommended that the New York State Independent Telephone Association affiliate with the International Association at once, and authorized the president and secretary of the Association to sign the necessary affiliation papers to bring the association into active relationship with the national organization.

The Committee on Re-organization recommended that the membership in the Association be changed from individuals to companies, and that for the perfection and maintenance of a complete organization the State be divided into districts, as is now being done in Ohio and several of the Western States. The wording of the recommendation of this committee in full is as follows:

"Membership to the New York State Independent Telephone Association shall be accorded to individuals, corporations or companies, operating at least ten telephones, each one paying a minimum annual assessment of one dollar, and paying annual dues of one per cent per operating telephone."

The State was divided into five districts, which are known as follows: The Buffalo district, Rochester district, Syracuse district, Albany district and Binghamton district. Officers appointed in these districts are: Buffalo—W. H. Johnson, chairman; B. L. Moore, secretary. Rochester—Geo. R. Fuller, chairman; Mr. Beattie, secretary. Syracuse—John B. Pierce, chairman; Mr. Poole, secretary. Albany—I. H. Griswold, chairman; Mr. Bellanger, secretary. Binghamton—Mr. McDowell, chairman; Geo. B. Wright, secretary.

The committee recommended that meetings shall be held in these districts in the months of October and April of each year, and that a standard form of report be forwarded by the district secretaries to the State secretary.

Considerable discussion ensued on the report of the Re-organization Committee, but it was finally adopted and approved.

Mr. W. G. Thompson, of Hamilton, Ohio, representing the International Independent Telephone Association, spoke at some length on the complete organization of all States in the International Association, after which the meeting adjourned.

It is felt by the members that more real work has been accomplished at this convention than at any of the State conventions heretofore. The result of the proceedings has been to complete the work of placing the organization upon a permanent and successful working basis. Sufficient revenue will be derived from the regularly provided assessments to give proper publicity to the development of Independent telephony throughout the State, and also lend a great deal of aid to the Legislative Committee in the gathering of information necessary in the performance of its duties.

The Independent Telephone Company of Syracuse entertained the delegates by a clambake at Long Branch in the evening. The entertainment provided was excellent, and reflects great credit on the hospitality of the Syracuse company.

It was the general sentiment of the convention that the meeting next year should be held in New York City.

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The Maintenance of Toll Lines and Operation of Composite Circuits

By N. C. Kissell.

FEW people outside of those directly interested know to what proportions the long distance telephone business has grown. This country, with the exception of a comparatively small area is covered with a network of wires, which connect together almost all towns of considerable population. These lines vary in length from a few miles to several hundred, and by being connected together at central offices can be made to extend for thousands of miles in a single circuit. Long distance conversations are regularly carried on to-day commercially for distances up to 1,200 miles, and not infrequently to 1,500 miles, and no doubt this distance some day will be doubled when telephone repeaters are perfected, and the lines loaded with coils to counteract the detrimental effect of the capacity of the line wires. A toll line extending over extensive distances must be maintained intelligently; it must be watched by men who can locate quickly and with accuracy any troubles developed and thus keep down the excessive maintenance cost which would develop under the supervision of incompetent men. This work of maintaining toll lines has grown into a trade of itself, requiring skill in observation and reasoning of the highest type, and knowledge which is only attained by years of practical experience in handling transmission lines. It would be foolish to tell a lineman when a trouble comes in on a circuit 500 miles in length, to go out and

ATLANTA-CHARLOTTE ROUTE.

CIRCUIT.	U.G. CABLE.	PAIR	GAUGE	PINS.	MULT.	RES. TO BOX
CHARLOTTE #1.	HARRIS-SPRING.	40	19	1-2	65	82

Fig. 1. Record card for toll circuits passing through cable, giving all the information necessary for the use of the wire chief.

find it. Telephone lines, unlike telegraph lines, do not follow a railroad, but run along country roads or go across the country through their own rights of way. In cities which are terminating points they pass into the exchange through cable and the lines are brought in open wire as close to the exchange as is possible consistent with any city regulations, on account of the detrimental effect of cable on toll lines. In exchanges where a large number of toll lines enter, a perfect record must be kept giving all information of the line from end to end, showing the cable pairs, pin numbers, any change in pin numbers along the route, test poles and test stations. A very satisfactory way of keeping such record is by means of cards, divided up into routes. In Fig. 1 is shown a card for the underground conductors, giving pair number, gauge, location of cable box, pin numbers, resistance of cable conductor and the multiple assigned on the toll board. In Fig. 2 is shown a test pole card which is a complete diagram of the pole as it stands, showing the different circuits and the pin numbers, the gauge of wire, and the resistance up to that pole. The cross arms are printed on the cards by means of a rubber stamp, made for that purpose. This gives an ideal record, as the test board man, looking at this card, sees the pole as it stands, sees the location of each circuit, and has a better idea than if the circuits were merely written in a book. A card is made out for every change in the circuits, such as one dropping off or changing pins. The cards are in rotation according to pole numbers and the route between cards holds true from one to the other. For instance, suppose one card shows pole No. 18,954, and the next card shows pole No. 19,020. Then the route in

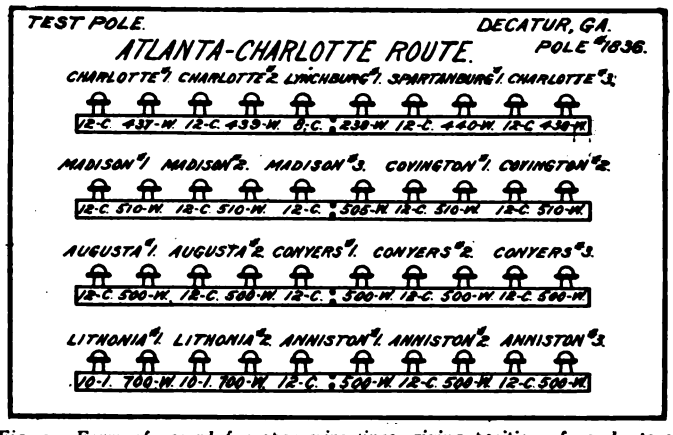
TEST POLE.
DECATUR, GA.
ATLANTA-CHARLOTTE ROUTE.
POLE #1836.
CHARLOTTE #1. CHARLOTTE #2. LYNCHBURG #1. SPARTANBURG #1. CHARLOTTE #3.
12-C. 437-W. 12-C. 439-W. 8-C. 238-W. 12-C. 440-W. 12-C. 436-W.
MADISON #1. MADISON #2. MADISON #3. COVINGTON #1. COVINGTON #2.
12-C. 510-W. 12-C. 510-W. 12-C. 505-W. 12-C. 510-W. 12-C. 510-W.
AUGUSTA #1. AUGUSTA #2. CONYERS #1. CONYERS #2. CONYERS #3.
12-C. 500-W. 12-C. 500-W. 12-C. 500-W. 12-C. 500-W. 12-C. 500-W.
LITHONIA #1. LITHONIA #2. ANNISTON #1. ANNISTON #2. ANNISTON #3.
10-1. 700-W. 10-1. 700-W. 12-C. 500-W. 12-C. 500-W. 12-C. 500-W.

Fig. 2. Form of record for open wire lines, giving position of conductors on test pole.

between these two cards is the same as is shown on the card for pole No. 18,954. Some change has taken place at pole No. 19,020, which will be shown on the card. If the route were, say, 150 miles long, and there were no change whatever in the circuits from end to end, only one card would be necessary to cover the whole route. A complete test station record is also kept upon these cards. This record shows a diagram of the test panel, the name of the place and the pole number at which the lines enter the station.

Fig. 3 shows the arrangement of such a card. This is used by the test board man to make his tests, such as the Varley loop, etc., and also for patching. The wiring and working of these test stations will be taken up later. This card record, having separate cards for each route, affords an ideal way of keeping the record of a route, as everything is before one just as the

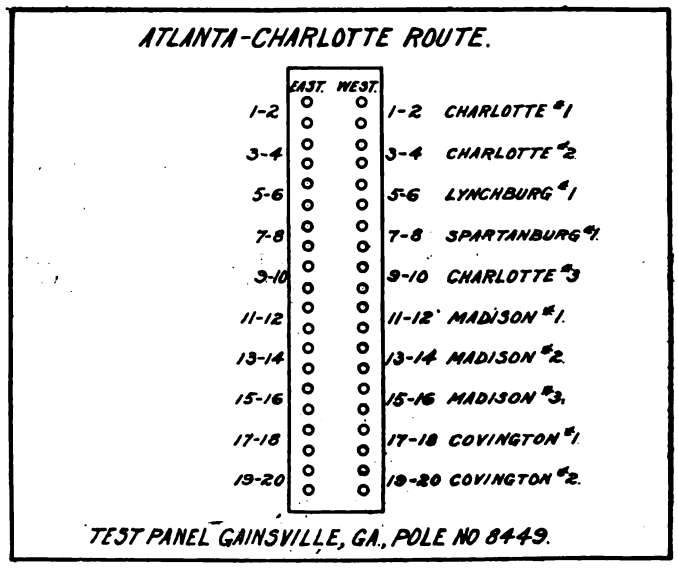

Fig. 3. Test panel diagram, showing positions in the panel taken by conductors of toll lines. From this information the wire chief directs patching, setting up of "Morse" and phantom circuits, etc.

route runs, and it is not necessary to look through a lot of books

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for any information. Everything desired can be learned from an inspection of these cards. For example, a lineman calling in for a test, tells number of the pole where he is, and the test board man, taking out a card, sees at a glance all the conditions and layout of the circuits for any test he may desire. Routes of any length should be divided up into sections, and a lineman assigned to each section. The length of these sections is determined by local conditions, such as whether the route follows the roads or is all over private rights of way, whether the country is level or very hilly, and if it passes through a number of little towns which are accessible by railroad and where teams can be procured. Under ordinary conditions, a lineman's section should be placed at 60 miles, with the man stationed at the center of this, thereby having 30 miles each way to cover. This can be done in half a day's drive if necessary. At each lineman's station a test panel is installed. This can be placed in the local exchange if there is any at that point, or in the lineman's residence. This will place test stations 60 miles apart.

Fig. 5 shows an ideal arrangement on a route 180 miles long. A and B are the terminating stations, and the lineman at these points covers 30 miles of the route. The linemen at the test stations cover 30 miles each way. This divides the route up equally. The linemen are not only for the purpose of clearing trouble, but are held responsible for the maintenance and condition of their sections. Twice each year they should make a thorough inspection of their respective sections, noting all heavy work to be done, such as replacing poles that will not last much longer, rotten cross arms and pulling slack. They must keep any right of way cleared out and should be acquainted with the property holders through which the route passes and thoroughly understand the company's rights in relation to same.

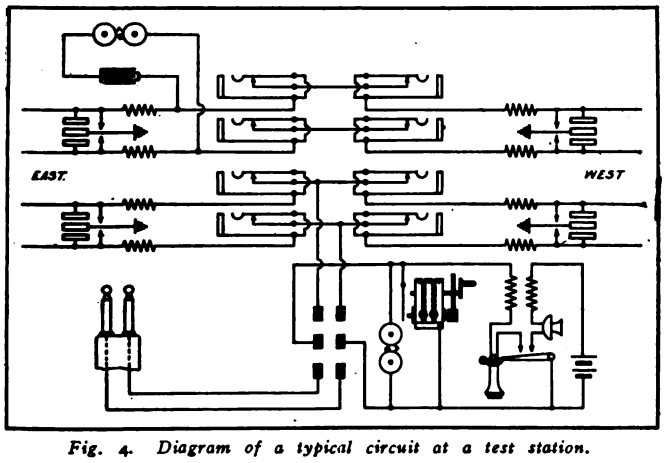

Fig. 4. Diagram of a typical circuit at a test station.

Section toll linemen should be men of more than ordinary intelligence, as they are in reality managers of a certain amount of the company's property and should be able to handle the company's interests as regards the lines in their section.

The wiring of test stations is shown in Fig. 4. Here the lines are brought into the station by means of heavy okonite cable or twisted paired wire. These stations should be as close to the route as possible, so as not to introduce any great length of wiring. The lines entering from the east pass through a fuse and carbon arrester, through the jacks and out through another arrester to the west. A telephone is placed near, connected to a double pole, double throw, switch or key, and is connected to a certain line normally as shown. By throwing the switch the telephone is disconnected from line and connected to a double plug and cord for testing purposes. On one or more other lines passing through the panel a 1000 ohm extension bell is bridged across through a condenser. This is used to signal the station in case the line on which the telephone is connected becomes in trouble. Upon hearing this bell, the parties at the station use the plug on the telephone and come in on the line carrying the bell.

On each route a certain Morse layout is maintained, that is, the same wires are used each day for certain lines unless, of course, the line is in trouble. For instance each day 1-2 are symplexed, 5-6 composited, 9-10 worked straight for long lines, 15-16 and 17-18 are phantomed. The linemen at all the stations are also acquainted with this layout, this being necessary in order that they may know better than to interfere with the service by coming in on these lines at any test panel and opening them; also that when on the route they may be careful not to use a composited line to call in on, on account of crossing the "Morse."

Fig. 6 shows a concrete example of the value of test stations in patching. Here *a b c d e* are test stations, and the crosses indicate a line in trouble at the point marked. In this case we have all six lines out, or a total failure, but after the lines are patched

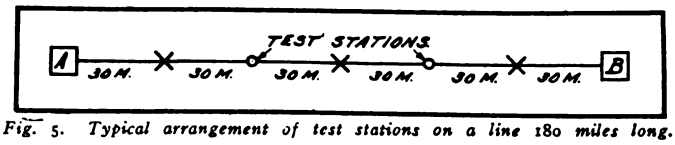

Fig. 5. Typical arrangement of test stations on a line 180 miles long.

at the stations five are made good and only one out, as shown. All the test stations are equipped with single cords with a plug on each end for this purpose. They are also provided with plugs for opening the lines at the jacks either way, and also for crossing them out. All these are used for making tests with the test board men at the terminal stations. By placing an open plug in the jacks the tip spring is raised, thereby opening the circuit, and placing a "shorted" plug in the line causes that end to be crossed out. This is used in making a Varley loop to locate a ground or high resistance cross, the line being first opened to determine the bad wire and then crossed out to form the loop.

(*To be continued.*)

"NO FURTHER USE FOR TELEPHONE" IS NOT AN OCCASION FOR TAKING OUT THE INSTRUMENT —SEND A SOLICITOR.

PREVENTING disconnections of people perfectly well able to pay for telephone service is one of the things necessary for the healthy growth of any telephone system. The way in which this problem strikes many an exchange manager is well stated in a query published in *The Transmitter,* issued by the Colorado Telephone Co. It is "What can be done to reduce the number of disconnections made because subscriber has 'no further use' for a telephone?" The letter in which this question appeared goes on to say:

"Thirty-five per cent. of the disconnections in my district are made because the subscriber has 'no further use' for the telephone, and I find it almost impossible to persuade any of this class to retain our service.

"It is not encouraging to be confronted at the close of the month with a very small net gain, after a month of soliciting, with its consequent expense, and a good amount of business written up."

In response Mr. John F. Greenawalt, editor of the paper, indicates the right method of dealing with the situation as follows:

"In the first place, it is not a difficult task to sell a man something that he needs, and knows he needs, and has decided to buy. A long list of such sales to one's credit is no evidence of superior ability on the part of the salesman; but where the

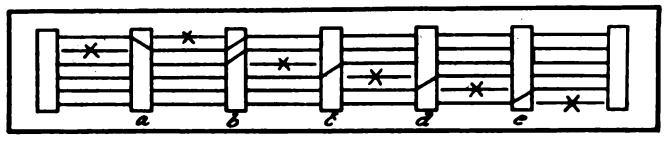

Fig. 6. Example of patching in such a way as to make five good lines out of six lines, each of which has a section damaged, so that if all were cut through straight they would be entirely out of commission.

prospective customer has decided in his own mind that he hasn't sufficient need of an article to warrant his purchasing it, he affords a splendid opportunity for a test of salesmanship. The man who is able to point out the advantages that would accrue to the "prospect," by having the article, in a way that convinces him beyond doubt that he is making a mistake in *not* having it —that man has proven his right to the title of "salesman."

"But there is still another case that puts the ability of the salesman to a severe test, and we may as well apply it at once

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to the selling of telephone service. A majority of men are taken with periodical spasms of retrenchment. They decide that bills must be cut down forthwith, and immediately they cast around for the commodities that can be dispensed with. Take the case of a man who decides that the telephone must go. He has had it for some time; it is no novelty, and its use has gotten to be a sort of mechanical procedure, so that he doesn't realize how important a factor it is in his daily life. He accordingly "orders out" his telephone and asks for his bill.

"Now, it is not enough to send the collector around, and let him as he presents the bill suggest that "We're sorry you don't feel that you want to keep the telephone"; or to have the installer, when he goes around after the instrument, suggest that 'you better keep it.' That is a case for a *salesman*. The subscriber needs the telephone, but he does not realize it. He must be shown and the point is that a solicitor, who is at the same time salesman enough to convince a non-subscriber that he needs, and can afford telephone service, should have the ability to prove to the subscriber who already has it, that he still needs it, and that he cannot afford to be without it.

"In the opinion of the writer, the best man in your exchange is none too good to send out to interview the man who has 'ordered out' his telephone."

DID HE GO TO THE RIGHT PERSON?

A SUBSCRIBER who is a heavy user of toll lines, says New England *Telephone Topics*, has had considerable trouble of various kinds, and was told to call 2180 and the toll supervisor would promptly adjust the difficulty. The next time he had occasion to find fault with the service he rang up 2180, and, in a voice choked with emotion, asked "Is this the toll sympathizer?"

Reasons for a Typical Case of Increase in Cost of Service with the Growth of a Telephone Plant

By E. S. Moorer.

RECENT visits to a number of Independent telephone exchanges seem to afford evidence that while most telephone men have a vague idea that the cost of giving telephone service to each subscriber increases as the number of stations is enlarged, few of them have gone sufficiently into the matter to be able to give a clear-cut reason why this is so. With a view to throwing a little additional light on this peculiar phase of the telephone business, the following reasons for this ever increasing ratio of cost per station to the number of stations are submitted, with illustrations taken from the actual experience of a company with which the writer was indirectly connected for a sufficient length of time to acquire accurate and complete information. As the community served by this exchange grew, during about ten years when it was under the writer's observation, from a town of a little more than fifteen hundred inhabitants to a city of sixteen to twenty thousand, with large manufacturing interests, and as the telephone plant kept pace with the growth of the town, it affords an exceptional opportunity to make the necessary cost comparisons.

The exchange originally grew out of a need for telephone service and was financed and built by men who had no knowledge of the business, and who went into the venture more as an act of public spirited endeavor than as a business undertaking. The result was an exchange built according to no definite plan and of the cheapest material obtainable. The system was the "ground return" kind, with fence wire supported on oak poles by side brackets, porcelain knobs, and anything else of the sort that happened to be at hand. The telephones "talked fine," and since the service was required more as a means for social intercourse and the gathering and the disseminating of gossip than as an adjunct to the business of the town, cross talk was an advantage and the service was "entirely satisfactory."

After about a year, during which the town and the breadth of ideas of the people had grown somewhat, the town council concluded that the poles were unsightly and demanded that the company rebuild with larger and better ones. The price of the new poles averaged about a dollar and a half each, and the change practically necessitated the rebuilding of the plant. Four and eight pin arms replaced the knobs and side brackets. Two years later the president of a large cotton mill heard—through induction—a railroad agent give another mill a better freight rate, and forthwith the president of mill number two (a member of the city council) had an ordinance passed requiring the telephone company to make all of its lines metallic circuits in order to insure privacy in conversation. This necessitated the standardizing of all construction and the adding of several miles of cable. In addition to this, sufficient pressure was brought to bear on the company to cause it to equip the exchange from switchboard to instrument with the latest common battery apparatus, and now that the town has grown into a prosperous city of practically twenty thousand inhabitants, the company is being urged to put its wires underground, and it is only a question of time when this agitation will crystallize into an ordinance compelling it to do so. The cost of this will amount to about twice the present value of the plant.

If the reader has followed this statement he has before this time observed how the company, time and again, has been obliged to change its equipment long before the life limit of the equipment was reached. This is not an exceptional case, but has been characteristic of the majority of exchanges that have been started in small towns. Of course, experienced companies now build better at the start, but the experiences of this company have, in the main, been true of all. In spite of press notices circulated in newspapers, these errors have prevailed widely among Bell systems, and in fact have become known as the bane of the telephone business.

Now for a few facts that can be remembered:

First. Better service, necessitating more expensive construction, becomes necessary as the exchange grows. The line cost for the first installation of ninety-eight telephones in the town under discussion was as follows:

28	30 foot oak poles, at 50 cts. each	$14.00
86	22 foot oak poles, at 30 cts. each	25.80
280	cross arms, with lags, at 27 cts. each	75.60
1250	oak brackets, at 1 cent each	12.50
280	pairs braces, home made, at 9 cts. each	25.20
4050	pony insulators, at 2 cts. each	81.00
26	miles No. 12 wire, at $5.54 per mile	144.04
4700	porcelain knobs, at .006 each	28.20
	Construction and incidentals	228.00
	Total	$634.34

Or, $6.47 per station. The outside construction for the present plant of 584 subscribers cost $12,274.00, including at actual value a small amount of old material, or $21.01 *per station*. These figures do not, of course, include instruments or exchange equipment.

Second. There are more calls per subscriber as the subscribers increase, since there are more people to whom each subscriber may talk. Up to two hundred subscribers the company employed only one day operator, the trouble man acting as relief at the dinner hour, and answering the few night calls. Now, with six hundred subscribers, it requires seven regular operators and three

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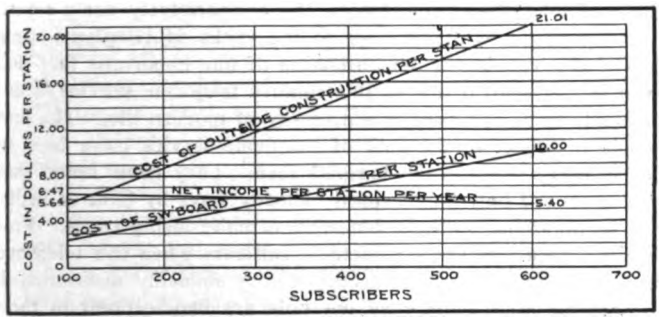
reliefs to do the work properly, and each operator answers as many calls in a day as did the first operator employed, when she took care of all the business alone.

THIRD. More experienced and expensive help is required as the quality of the service is improved. With two hundred subscribers, the company's force consisted of a "combination man" at thirty dollars per month, an occasional helper at seventy-five cents per day, and an operator at fifteen dollars per month—or about thirty cents per subscriber per month. With six hundred stations the force consisted of:

1 manager at	$100.00	per month
1 inspector at	60.00	" "
1 comb. man at	40.00	" "
1 bookkeeper at	50.00	" "
2 linemen at $30 each	60.00	" "
3 rel. operators at $12 each	36.00	" "
4 regular operators at $25 each	100.00	" "
1 chief operator at	40.00	" "
2 night operators at $20 each	40.00	" "
1 collector at	30.00	" "
Total	$550.00	per month

Or, *ninety-two cents* per station per month.

FOURTH. Beyond a certain point the cost of the switchboard increases tremendously as its capacity increases. The first board



had one hundred and sixty drops and cost $400.00, or $2.50 per drop. The present board, equipped for six hundred lines, cost a little over $6,000.00, or about $10.00 per drop. This increase in cost per drop is due, chiefly, to the necessity for equipping each section of the board with as many jacks as there are drops in the entire switchboard, and the additional wiring incident thereto.

FIFTH. Since the cost of equipment per station is greater with the larger plant, all such fixed charges as taxes, insurance depreciation, etc., amount to more per station.

The accompanying diagram will show graphically the relation of "cost per station" to "number of stations," as applied to the exchange referred to at the intervals mentioned. The curves, however, are correct only at the one hundred and six hundred station points. The positions of intermediate portions of the curves have no significance except as guides for the eye from the first to the last figures. The diagram also shows the gross and net incomes of the company. It will be noted that while the former more than doubled, the latter suffered a reduction of twenty-four cents per station per year.

Other reasons might be given to show why the cost per station increases as the number of stations increases, but these are the chief ones, and will answer the purpose of this article.

WHAT HAPPENED TO AN UNDERGROUND CABLE PLANT.

MANY telephone companies have definite rules covering the manner of grounding cables and messenger wires, but apparently all men who claim to be telephone engineers do not understand the necessity for doing this work in the manner which is generally recognized as standard practice. A. J. Rider, president of the Hammonton Telephone & Telegraph Company, Hammonton, N. J., tells of a costly lesson he received in this matter at the time he first went into the telephone business. He says, in a recent letter, "When our plant here was constructed we employed to supervise its installation a man who was recommended to us as an expert engineer. When the cables were put up I said, 'There is a mass of metal, in the cables and messenger wires, of high conductivity. It will certainly accumulate an electric charge in an electric storm when the atmosphere is heavily charged, and how is that to pass off? There should be a ground connection.'

"The engineer said that 'no ground connection was found to be necessary in practice, the charge would find its way off all right.' It did, too, and in doing so not only burned out the fuses but put about 100 telephones out of commission on several occasions. When the ground connection was finally made the trouble was stopped at once, and later storms have not bothered us."

DRUGGISTS' ASSOCIATION COMMENDS USE OF SLOT MACHINES IN TELEPHONE PAY STATIONS.

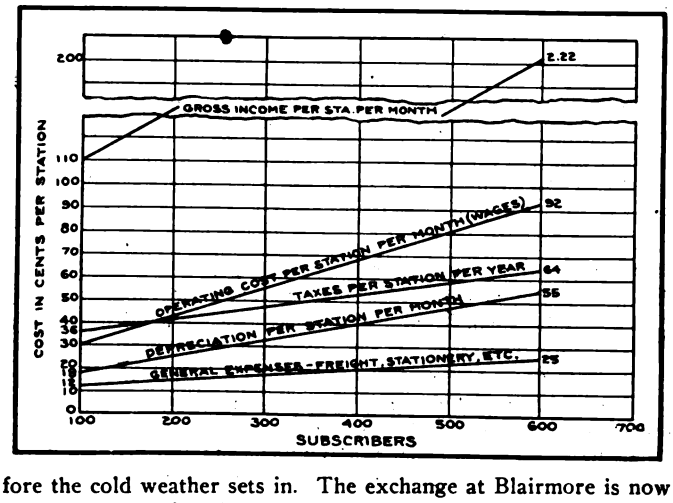
AT the convention of the National Association of Retail Druggists held in Chicago a few days ago, a report of the special committee on telephones strongly recommended that the druggists throughout the country take such action as would insure the installation of coin box telephone pay stations on their premises. In this report William Bodemann, of Chicago, who read the report, stated that in 1895 the druggists in Chicago paid $150 a year apiece for grounded line, and later $225 for metallic line telephone service, before the slot machines were installed. From the public they collected a very small proportion of this charge.

At the present time in Chicago nearly all of the 1,000 druggists in the Association are using the slot machine pay stations, and instead of having to pay for service which they give free to the public, are receiving an annual revenue of about $80 each from the instruments. It doesn't take much figuring to see that the telephone companies are making a very handsome profit from the use of these pay stations when they can afford to pay the druggists a commission like this.

INDEPENDENT GROWTH IN ALBERTA, CAN.

GREAT progress has been made by the construction gangs employed by the Provincial Government of Alberta, Canada, in constructing lines throughout that territory. Although the work is not more than six months old, it is apparent from recent reports that by the coming winter some five hundred miles of government owned line will be in operation. In addition to the trunk lines, some twelve or fifteen local exchanges have been installed along the various long distance lines.

The construction of the Lacombe-Stettler line has already been completed. The Stettler-Daysland line will be completed within a short time, and the construction gangs will be transferred to the Edmonton-Lloydminster line, which will be completed this Fall. Eighty miles of the McLeod-Blairmore trunk line is under construction, and it is reported that the line will be finished be-



fore the cold weather sets in. The exchange at Blairmore is now in operation, having been taken over from a private company and standardized. The rural line northward from Vegreville, which will run through an exceedingly rich farming country, is under construction.

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Comments on Live Topics

PUTTING THE COSTS IN THEIR PLACE.

WHEN a telephone man makes a serious attempt to trace from the actual records on the books of a company, and an examination of the plant, the reasons for the variation in the cost of service from year to year, he deserves considerable credit. Some business men might say that the above statement is amusing—but the report of the Chicago Special Telephone Commission, which showed that there were no records available in that city which would show the cost of giving any particular class of service, an examination of numerous statements prepared with the intention of enlightening city governing bodies concerning alleged necessities for raising rates, and, in addition to these, not a few inquiries from anxious subscribers —all these lead us to hope that our readers will appreciate the real seriousness with which the statement is made. The trouble seems to be that there is hardly ever any earnest attempt to trace out the costs of maintenance and operation in detail until the actual moment when they are most urgently needed; this is apparently not considered as a fit subject for a routine report, to be made up at fixed intervals, but rather as something involving arduous labor which can be overlooked unless forced upon the attention of the management by some compelling occasion.

Even then the material available for a statement is often woefully inadequate. Some of the companies having well-developed engineering methods do make studies for certain cities which tend to show how many subscribers may be expected in each district at the end of each coming year, and what the relative proportions of the various classes of service will be. From these studies an estimate may be made for years in advance of what may be anticipated in the way of returns at selected intervals, and the kind and amount of installation and reconstruction work to be undertaken each year to produce results which will in the long run be most profitable. There is no reason why smaller companies should not more generally follow these methods, nor why employees of large companies should not make these studies as a means of acquiring a broader knowledge of the future requirements of the districts under their management.

A suggestion as to the proper lines along which to take up such an investigation is conveyed in Mr. Moorer's article on another page. The comparatively frequent reconstruction of the plant he has chosen as an example gave opportunities for obtaining figures which may be presumed to have in a considerable measure the most essential qualification—that of accuracy. The reconstruction points in the life of a plant are the places where it is most easy to determine the actual value, as distinguished from the book value, which may on occasion show figures so far from representing the real worth of a system.

It is always to be borne in mind that a telephone system must be considered as a thing of permanence. The rate of depreciation which affects the cost of service is not a percentage figure which can be determined by hit-or-miss guesswork. It is the ratio of the annual loss in value of the plant, due to physical causes, to the value of the plant in its original condition. As the physical loss varies from year to year so does the cost of giving service vary. It is the same with other component expenses which make up the service cost as it is with depreciation. The fundamental idea may perhaps be made clear to electricians by saying that corrections must be applied to book figures, when necessary, in such a way as to bring them "in phase" with the actual physical conditions to which they refer.

An attempt to obtain any practical results from existing records will at once convince any telephone man of the difficulty of making a satisfactory analysis with the object which has been suggested. For this reason intelligent collaboration among telephone men can be made extremely valuable. Mr. Moorer has given the total amount of increase in a given period, and explained reasons for its existence. His diagram suggests a means of plotting a curve which if data were set down at more frequent intervals would show what the approximate cost of service would be some years in advance. That is to say, if by comparing notes telephone men could determine the general shape of a curve of increasing cost, irrespective of variations in prices of material and labor, they could at the end of three, six, or eight years compare growth curves with cost curves, and begin to make adjustments of rates, expenditures and other items of income and outlay to provide much more accurately for a period four or five years ahead than is possible by any ordinary methods of rough estimating. It will be a good thing for the stockholders of many a telephone system if the managers will take the hints offered by Mr. Moorer to heart, and put themselves in a position where they will not have to draw a two-point curve to show how it happened—but rather have a complete one to show what is going to happen, so that there need be no excessive charges concentrated in any single year.

THE TELEPHONE BOYCOTT.

PUBLIC indignation has been aroused several times recently in a certain section of the country to such a pitch that, even where there was but a single exchange, citizens have for a time absolutely discarded the service which was offered them. Under the circumstances, the comparatively early return of most of the wrathful ones to the ranks of telephone users serves as a convincing demonstration of one important fact that even in the small towns of this country telephone service is undubitably to be regarded as a necessity of modern life. The first people to object to the lack of telephone service have been in nearly every instance the business men. They have found that they were not only handicapped in many ways by lack of facilities for outgoing business, but were actually losing trade. Professional men also are considerable sufferers when the telephone service to which they are accustomed is suddenly discontinued. In the case of doctors they not only are handicapped in their work, but have brought under their observation many instances of suffering which is prolonged through the inability of patients to get in prompt communication with their physicians in times of emergency. All these things combined are likely to speedily force the renewal of service contracts. The public may dislike to continue to furnish revenue to a company from which it believes it is receiving unfair treatment, but it speedily learns that even a poor service is better than none.

It is human nature to be unwilling to "back down" when once a determined stand is taken. Still, when a man has either to swallow his pride or go out and walk whenever he wants to speak to someone at the other end of the town it puts a rather severe strain on his principles. In at least one city in Texas just now the people are glad that they have learned the lesson that the telephone is not, after all a "natural monopoly." When driven to give up one service they can stick to their determination and still be able to talk over the lines of a competing system.

IS THIS A CRITERION OF WHAT THE BELL COMPANIES REALLY THINK OF THE IMPORTANCE OF THE INDEPENDENT TELEPHONE MOVEMENT?

MR. FISH, when president of the American Telephone & Telegraph Company, said in his report for the year ending December 31st, 1906: "The so-called Independent telephone companies have, as far as can be learned, except in a few localities, made no relative gains. It is a matter of comment that many of them recognize that their situation is unstable."

A paper published in the interests of one Bell company operating in a territory where there is competition, last month devoted one-eighth of its space to news of Independent companies. Another Bell publication devoted in its last issue nine columns out of thirty-four to matters relating to competing companies. Do the Bell companies really think that Independent telephony doesn't amount to much?

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Legal Telephone Items

CONDUCTED BY A. H. McMILLAN.

MORTGAGES AND TRUST DEEDS IN MINNESOTA.

What are the statutory provisions of Minnesota giving telephone companies the right to mortgage their franchises and property to raise money? I understand that in some States telephone companies cannot mortgage their franchise; is this true in this State? If so, could it be gotten around by giving trust deeds? We must raise money in some way and would like to make a bond issue properly executed, so would thank you for your advice as to the right way. Y. B.

TELEPHONE companies in Minnesota may mortgage or execute deeds of trust on their property or franchises for corporate purposes and may issue bonds in amounts not less than $500, with interest at not more than 6 per cent. per annum and convertible into stock, or not, if deemed expedient, and may sell them at prices thought proper. If the bonds are sold for less than par, the company may not make the defense of usury. Mortgages and trust deeds may lawfully include after-acquired property. Such mortgages and deeds of trust are to be recorded. Personal property belonging to the company is deemed part of the telephone line and the record is noticed as to both real and personal property. Revised Laws, 1905, Sections 2,902, 2,906. The above quotations from the public laws of the State fully answer your questions.

RIGHTS OF LINEMEN KNOCKED FROM POLE BY CAR.

AN experienced lineman was struck by a car when climbing a pole belonging to a telegraph company in whose employ he was. He was encumbered by a hand line attached to a coil of wire. The pole was a crooked one, located between the double tracks of the company. Before he started to ascend he saw the car which afterward struck him approaching at a distance of 150 feet and apparently going ten miles an hour. He did not notice that the pole slanted toward the track and wired his foreman to stop the car or notify him of danger. He sued the railway company for damages and was given a verdict. The company appealed on the ground that the lineman was negligent. The Supreme Court of Massachusetts decided that the lineman was entitled to depend on his foreman to protect him from danger, though the foreman was not in any way connected with the defendant and that the plaintiff was therefore not guilty of contributory negligence. Evidence of the custom of giving notice of danger to linemen by men on the ground was held admissable. Ahearn vs. Boston Elevated Ry. Co., 80 N. E., 217.

COLLISION OF THRESHING MACHINE WITH TELEPHONE WIRE.

IN the town of Turtle, Rock County, Wis., a man named Joseph Chant tried to haul his threshing machine along a highway with a traction engine without taking down the grain elevator, which extended 14½ feet above the surface of the travelled track of the highway. As the thresher passed under the telephone guy wire, maintained by the Clinton Telephone Company across the highway, the grain elevator ran against the wire, damaging it to the extent of $142. The plaintiff testified that he did not know the wire was so maintained as to strike the elevator of his machine, that he was paying attention to his engine at the time and that a strong wind blew smoke in his face so that he did not see the wire. The company denied all liabilities and also made a counter claim for damages to its guy wires and posts in the sum of $10. The plaintiff recovered a verdict of $74.80. Statutes of Wisconsin provide that "no telephone line or any appurtenance thereto shall at any time obstruct or incommode the public use of any road, highway, bridge, stream or body of water." Section 7,778, Rev. St., 1898.

It is also provided that all wires strung upon poles shall be not less than 24 feet above the ground at all crossings and not less than 14 feet above the ground at all other places. The evidence tended to show that the telephone company allowed its wire to sag, so that it was nearly 13 feet above the surface of the road. The case being appealed to the Supreme Court of the State, the judgment was affirmed, it being held that the defendant company was negligent and that the plaintiff was not guilty of contributory negligence as a matter of law.

The statutory provision making the owner of any steam engine liable for damages that may be caused by propelling such engine along a highway was held to have no application to the case, as no damage was caused by the engine being used in drawing the machine nor did it in any way contribute to the injury complained of. Rev. St., 1898, Section 1,347b. Hence it was held that the plaintiff was not liable to the defendant for damage to its wire. Chant vs. Clinton Telephone Company, 110 N. W., 423.

RIGHT OF FOREIGN TELEPHONE COMPANIES TO EMINENT DOMAIN IN NEW YORK.

IT has been held at Syracuse, New York, that no foreign corporation may condemn property or occupy the public highways of the State. The decision was made in a suit brought by James K. Whitaker of Watertown against the Northwestern Telephone and Telegraph Company, the Central New York Telephone and Telegraph Company, and certain individuals, to enjoin further performance of a contract entered into between the two companies on May 20th, 1907. Under this contract the Northwestern company agreed to turn its business over to the Central New York company; it was also provided that the Carthage company should cut off the Citizen's company from its territory by July 1st, which was done. Whitaker, who was the controlling owner of the Citizen's company, purchased 200 shares of stock in the Northwestern company to prevent a combination. During an illness the officers of the company had 67 extra shares of treasury stock issued, which they took themselves, and thus got a controlling interest.

The court annulled the issue of 67 shares of stock but denied a motion for an injunction to prevent the carrying out of the contract and to compel the re-connection of the wires.

On the stock question Justice Andrews holds thus:

"Directors cannot with secret knowledge of the existence of a contract which they claim to be of great value, issue treasury stock of the corporation and buy it themselves, particularly when the transaction converts them from minority to majority stockholders. Such a transaction is in the highest degree inequitable."

The court held the contract valid but expressed the opinion that it was very doubtful whether the Northwestern company, incorporated in Delaware, has the right of eminent domain or the use of the highways of the State.

ACQUIREMENT OF RIGHTS BY PRESCRIPTION.

If a telephone company has maintained its line across the field of a land owner for a period of twenty years without objection from him, is he in such a situation that he cannot object or cause the company to remove its poles and wires from his land? We understand rights can be acquired in that way in this State, and that telephone companies should have the benefit of it. In the case we have in mind, it is now impossible for us to prove whether we ever received actual permission from the person who owned the property at the time the lead was established, but we do not think it would have been built there without permission, as the owner at that time was a very exacting fellow. I. W. CO., New York.

IT is true, as you suppose, that rights of way can ordinarily be obtained by prescription in the State of New York. Prescription is a mode of acquiring title to rights of way by immemorial or long-continued enjoyment. The theory of it is that the right claimed must have been enjoyed beyond the period of the memory of man, which for a long time in England went back to the time of Richard I. To avoid the necessity of proof of such long duration a custom arose of allowing the presumption of the grant on proof of usage for a long term of years. However, it is expressly provided by law in New York that prescription shall not arise from the attachments of wires and cables to realty. Laws 1886, chapter 40, page 2,412.

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The Future of Loaded Submarine Telephone Cables

By Dr. A. Ebeling.

IN the technical press the opinion is occasionally expressed that laying of a Pupin telephone cable in Lake Constance, which was described a short time ago in American Telephone Journal (July 13, 1907), was really of no technical importance because the cable, on account of its comparatively short length of 12 kilometers, could not have demonstrated the clear working of the Pupin effect. The London "Electrical Review" of July 26th, 1907, p. 122, speaks editorially as follows regarding the Lake Constance cable: "A length of 7½ miles is absolutely useless for testing speaking conditions, and leaves the practical value of the Pupin theory unadvanced." It is true that this comment is in itself entirely warranted. It would show, however, a complete misunderstanding of the situation if the conclusion should be drawn that the great interest which the laying of the Lake Constance cable has excited in the widest circles of the technical world has been wholly in vain. The reason why the promoters undertook under such difficult circumstances the laying of the Pupin cable beneath the waters of Lake Constance, and what gives such great significance to the happy completion of the enterprise is not perhaps the obtaining of evidence that the Pupin system can be used with success in a cable 12 kilometers long—this evidence has often enough been put to proof in Europe as well as in America—but solely the purely technical result that it is possible at all to construct and lay an efficient submarine cable of considerable length, in the inside of which Pupin coils have been placed; and furthermore, the no less significant result that a cable with a lead sheath, the usefulness of which had hitherto been considered as limited to very moderate depths, can, by means of a certain special construction, be laid without hesitation at a depth of several hundred meters and can sustain while operating satisfactorily a constant pressure of a couple of dozen atmospheres.

Before one can expect to use the Pupin system, which has proved its value on long interurban lines, for long distance submarine telephone cables—in which very likely at some future time it will have a very great importance—one must first experiment intelligently with a comparatively short submarine cable, in which the detail of the entirely new construction and the new methods of laying of the Pupin submarine cable can be studied without too great pecuniary risk. The first experiment has now been completed with the laying of the Lake Constance cable. Now that the first experiment may be considered as having been satisfactorily completed greater installations may be undertaken with full confidence under similar conditions, as, for instance, the laying of a loaded submarine cable between England and Germany. One might rather venture on somewhat large undertakings of that sort than meet the conditions under which the Lake Constance cable was laid, conditions which are far from being "comparatively simple," but on the contrary are unusually complicated, because in European lakes and bays depths of fully 250 meters must be crossed, and, at the same time, conditions have to be met which require seven pairs of conductors grouped in the cable. This aggravation of the difficulties must seem very hard and wholly abnormal in the light of the former technology of submarine telephone cables. That the question of how to overcome the new conditions has been solved is, along with the mechanical solution of the question how to introduce in the cable the Pupin coils without notably increasing the diameter of the cable, the great permanent success of the Lake Constance installation.

Comments upon the short length of the first Pupin submarine cable do not touch the heart of the problem. But, now that the first short cable has been laid in Lake Constance with complete success, it is probable that much larger installations will follow in consequence, and bring about the result that the experience there gained will make possible on a larger scale the use of the Pupin system for submarine cables.

Editor's Note.—Dr. Ebeling is associated with the engineering staff of Messrs. Siemens & Halske, Berlin, makers of the Lake Constance cable.

CAN YOU BEAT THIS?

MANY are the pranks attributed to the playful streak of untamed lightning and there is scarce a week goes by that one does not hear of some new stunt it has played. But just read this letter which was received by the Editor recently from Mr. J. E. La Mont, of Lafontaine, Kansas:

"Lightning struck the chimney of a frame building, followed it down to a stove pipe hole in a second floor room and jumped about eight feet to the corner of an iron bedstead and from another corner of the bed to the wall only a few inches away; burnt a hole in the knob on the bedstead as it left.

"Thence it went diagonally downward through the wall to the corner of the building and then in another wall for a short distance and to the telephone line, a grounded one, which passes near the wall. The charge then burned the wires loose from the lightning arrester, and destroyed them together with the ground wire.

"The instrument was entirely unharmed, but two razors lying on the arm shelf were strongly magnetized. On the side of the house, where the live wire lay near the building, the weather boarding nails came out of the wood about a quarter of an inch over a space of over four or five feet square.

"Besides the path mentioned, it seems to have gone between the floor and ceiling, also to have jumped out through an open window and six or eight feet through the air to the line.

"A man lying on the bed with his head in the window which the charge had to pass through or around is an ear (not eye) witness and was practically unharmed."

Now, who wouldn't be just a trifle dubious as to a yarn of that sort? The editor can hardly be blamed for writing Mr. La Mont in this fashion:

"We were very much interested in the little item you sent us.

"If this really happened, truth is certainly stranger than fiction. Honestly, we would never dare print it, but we are willing to take your word for it if it actually did happen. Won't you please come right out and say whether it did or not?"

Behold the proof that came back:

Lafontaine, Kans.,
August 30, 1907.

To Whom It May Concern:—

Having read carefully the letter that Jno. La Mont wrote The American Telephone Journal, I being an occupant of the said house would verify every statement in his letter; further, I can furnish a dozen other witnesses that would state on oath that it is every word true. Mr. La Mont has not exaggerated this fact one bit and if it would be any help to any one I would furnish further information or witnesses to the fact.

Respectfully yours,

D. N. Fink.

If any one else has any genuine stories of lightning pranks that can beat this and that can be sworn to, send them in, we want to see them!

MICHIGAN MANAGERS TO MEET AT BATTLE CREEK NOVEMBER 13 AND 14.

ARRANGEMENTS have just been completed for the holding of the semi-annual meeting of the Independent Telephone Managers' Association of Michigan, at Battle Creek, November 13 and 14. Officers for the ensuing year will be elected at this meeting.

"Trouble" has been chosen this year as the topic of discussion. Not only will the managers and heads of departments be present, but all employes connected with the trouble depart-

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"THE ORIGINAL GRAY."

Gray Pay Stations Pay

165,000 of our Stations in use is our Best Indorsement.

They are Automatic—no Levers or Springs.

GRAY TEL. PAY STATION CO.

HARTFORD, CONN.

We send Catalogue on request.

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE.—Telephone exchange and from 100 to 200 miles long distance line in Missouri, making good money; for sale at a bargain. Full particulars and satisfactory reason for wishing to sell on application. Address Box 932, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 932

FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—After October 1st, position as exchange manager. Ten years' experience in large and small exchanges. Address Box 936, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 936

WANTED—Chief operator for central energy plant of 5,000 subscribers. Must be able to handle operators and understand switch room work. Good salary to proper party. Address Box 935, care AMERICAN TELEPHONE JOURNAL, New York. 935

CASH paid for telephone photographs.—Telephone engineer wishes to secure photographs of standard and new methods of open wire line and aerial cable construction, conduit laying, manhole building, etc. Will pay 75 cents each for acceptable "solio" prints. Address, Box 902, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 902

WANTED.—Two or three good telephone men for troublemen or managers of magneto exchanges of 100 to 300 subscribers. Wages $30 to $50 per month. State experience and give reference. S. H. Young, Sparta, Tenn. 934

ENGINEER who can lay out and superintend the construction of underground and aerial, telephone systems for permanent economy is desirous of making change. High class propositions only will be considered. Address Box 937, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 937

BUY BELDEN RECEIVER AND DESK-STAND CORDS

Our No. 3 Catalog makes it easy to order Belden cords. Every kind of telephone cord is explicitly described with pictures showing each arrangement of tips, clips, stay cords and terminals.

HAVE YOU RECEIVED A COPY?

BELDEN MANUFACTURING COMPANY

194 MICHIGAN ST. CHICAGO

CONDUIT RODS ARE NOT ALIKE

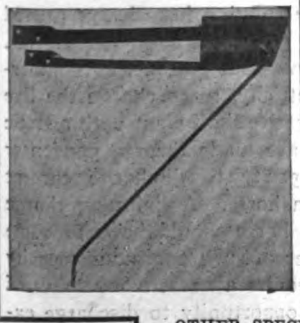
FOR INSTANCE

SECURITY CONDUIT RODS

are light, joint and unjoint easily and quickly and cannot separate when in the duct. They're very low in price.

Get Booklet Number Three. It tells of other points of difference. Write today.

THE F. BISSELL COMPANY, TOLEDO, O.



$ ONE $

Yankee Pole Seats

CAN'T BE BEAT FOR TWICE THEIR COST

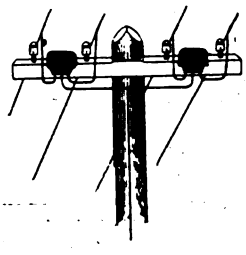
Made of 1½ inch angle iron, painted with a weather proof asphalt paint, to which is bolted a 1⅛ inch seasoned, creosoted pine seat.

STRONG—DURABLE—NEAT

OTHER SPECIALTIES DESCRIBED IN OUR BULLETIN, WHICH MAY BE HAD FOR THE ASKING.

THE TELEPHONE APPLIANCE CO., MINNEAPOLIS, MINN.

CHAPMAN LIGHTNING ARRESTERS



Have been proven, both by scientific test and practical service, the very best possible protection for:

TELEPHONE LINES.
TELEGRAPH LINES.
FIRE ALARM LINES.
CROSSING ALARMS.
INTERLOCKING SYSTEMS.
SIGNAL SYSTEMS.

We shall be glad to prove that they are the *best* for *your* system.

Write Us To-day.

MINNESOTA ELECTRIC CO., Minneapolis, Minn.

H. E. COBB, Selling Agent, 1501 Monadnock Block, Chicago, Ill.

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ments of the different Independent companies in Michigan.

It is the aim of the association this year to have papers by members who have not heretofore participated in the program, and to make the discussion general.

A WAY IN WHICH THE COST OF FUSES FOR SMALL EXCHANGES MAY BE REDUCED.

By R. F. Baines.

ONE feature of maintenance that enters largely into the cost of operation of a small exchange is that of fuses. The customary practice is to use fuses of the Western Union or Postal type of from ½ to 3 amperes capacity and a number of fuses frequently have to be replaced after every thunderstorm.

Another feature is that a large percentage of the fuses so made up are very likely to be found "open" when the time comes to install them in the lightning arrester, as they are very delicately put together. The heating which is necessary to apply the small drop of solder to the fuse wire and to the copper tip screws seems to weaken the fuses so that with very little handling they become unfastened. These fuses usually run in cost from 75 cents to $1.25 per hundred.

One way in which the writer has found this may be reduced is to fasten securely to the ground carbon plate of your arrester two strips of mica, leaving about ¼ inch space between them, then connecting the inner posts of the line terminals together with pieces of ordinary fuse wire of the desired capacity. This is shown very clearly in the accompanying diagram.

This appears to be a very simple way of getting around this difficulty and one which can be prepared in a very short time with practically no cost. The fuse wire on the spools can be purchased for about one-fifth the amount that the same length of wire mounted on regular terminals would cost.

RATIONAL EXPLANATION SHOULD ALWAYS BE SOUGHT IN CASES OF INJURY BY ELECTRIC SHOCK—INTERESTING OPINIONS ON A RECENT OCCURRENCE.

C. H. JUDSON, chief engineer of the Independent Telephone Co., of Seattle, has offered some interesting remarks on the subject brought up in the report of an accident in Dowagiac, Mich., published in American Telephone Journal (issue of Aug. 3, page 75).

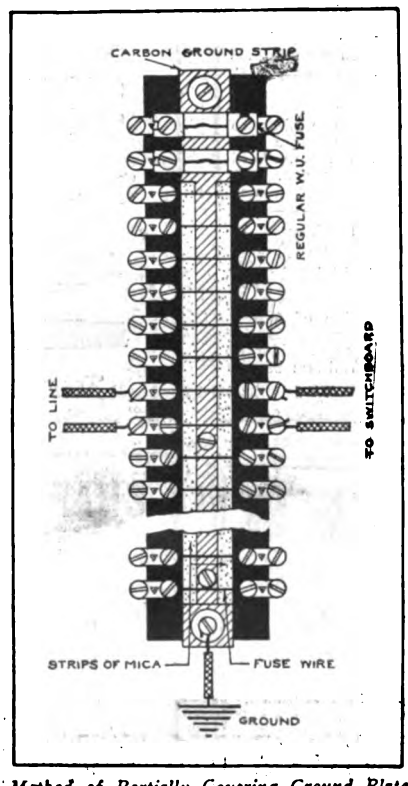
Quotations of general interest to telephone men from his recent letter follow:

"After reading the item carefully I am at a loss to explain the occurrence or deduce its cause from the facts which are furnished. No rule of electricity can possibly explain the cause of the killing of the horses or the shocking of the man who walked in the puddle. It is a well-known fact that a current can only flow through a conductor and that it will not leave a conductor of low resistance to enter one of high resistance unless the conductor of high resistance is not continuous, and the conductor of low resistance is continuous. The resistance of the body of a horse or a man is very great; much greater than that of a body of water or damp earth of the same dimensions. Under any rule of electricity it would not be possible for a ground current to leave the ground, traverse the body of a horse, and jump through a space of eight feet in the air back into the ground again. Such an idea of course is absolutely preposterous. This must necessarily have been the case had the horse been killed by the current leaving the ground through the puddle in which he was seen to be standing.

"As you say in your letter this is one of a number of cases of similar character which have been reported. I have had a number of these cases reported to me, but they are very largely like ghost stories; they usually materialize into something somewhat different from the story as originally told. I have found in a large number of cases, where such accidents have occurred, that the man who was driving the horses has generally been so flustrated by the accident that he has been absolutely unable to tell with any degree of accuracy what actually did occur, or what actually were the conditions at the time of the accident. This flustration of the mind is of course a condition which affects practically every human being more or less in times of great shock, and no doubt the man was very much shocked to have both of his horses killed at once.

"I am fully persuaded in my own mind that if the horses were actually killed, as the article states, upon walking into the water, that there must have been a conductor of current in the shape of a wire above them touching them. Although it was reported that there were no marks upon the horses, this is not proof that there was no such conductor, inasmuch as I have seen horses and men who have been killed by high voltage wires upon which the marks were so small as to be almost impossible to detect in the case of a human being, and in the case of a horse absolutely impossible. It requires a certain amount of time to dry wet hair on a horse's back and burn it. The horse could be killed in a very small fraction of this time.

"In a case in which I was a witness recently where a man was, according to the opinion of the coroner's jury and according to the opinion of the Court in which the damage case was tried, killed by a 2,300 volt current from a live wire, the only mark upon the man's body was a small brownish colored spot on the calf of his leg about an eighth of an inch in diameter. I am not prepared to say that this spot was caused by the electric current. I was of the opinion that the man was not killed in any such manner, as there were evidences of his having been killed by receiving a current in a different part of his body. However, I have known cases where it has been almost impossible to find the place where the current entered and left the body of a person killed in this way owing to an apparent total absence of marks.



Method of Partially Covering Ground Plate of Arrester to Reduce Cost of Fuse Replacements.

"I find it is very frequent for companies affected by accidents of this kind to immediately remove all traces of the bad conditions of their lines in order that the evidences may be destroyed as quickly as possible. A case of this kind is recalled where a boy was killed by touching a telephone wire which hung over an electric light wire carrying a high tension current. Within twenty minutes of the time the boy was killed a representative of the telephone company was on the ground, but before he had reached the spot the employes of the electric light company had been there and had pulled up their wire so that the evidence showed that the telephone line was in fault.

"I do not recall any occurrence of this kind which has ever been explained at all that has not been solved in a perfectly rational manner, and the solution has always proved fully the rules governing electric currents. It would not have been possible, as I understand static electricity, to so charge the live wires of an operative light plant with a static current as to have made them a condenser of sufficient capacity to discharge current enough to kill a horse. A lightning charge that will kill a horse would have to come from a condenser of such enormous capacity that it would require a great many miles of wire having no opportunity to discharge except at this one particular spot. Obviously these wires could not act as a condenser inasmuch as they were continually leaking and the static current would unquestionably ooze out at every insulator during a rain storm."

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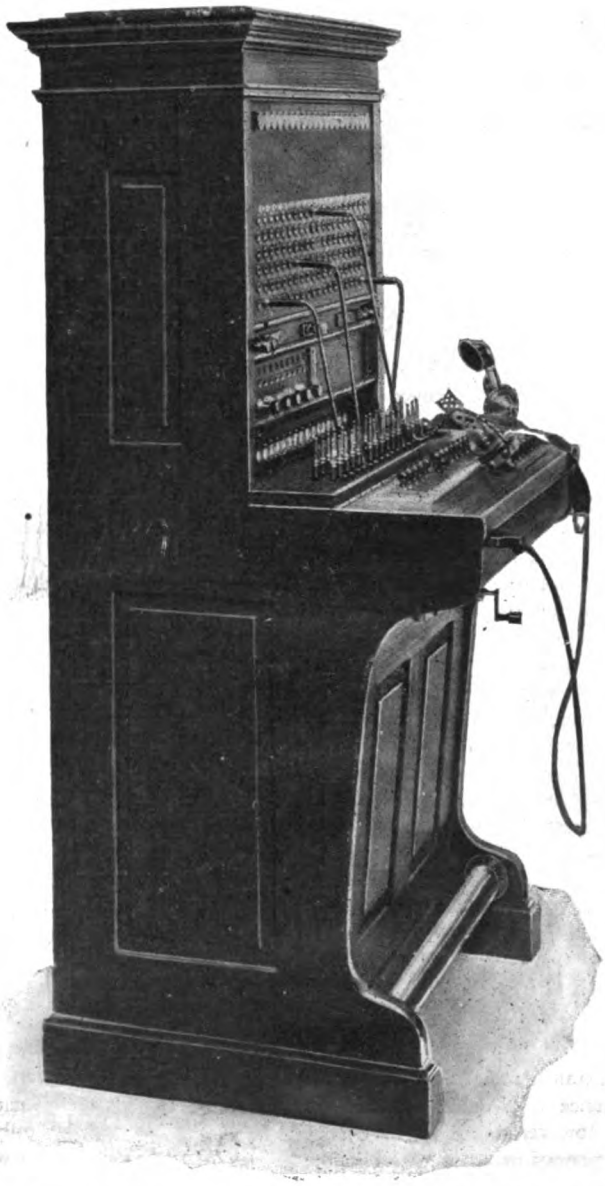
THE NEW ERICSSON "TYPE B"

INDICATOR JACK SWITCHBOARD



With the new "Type B" switchboard one operator easily handles 200 lines as against half that number in other self-restoring boards.

This is made possible by the compact character of the "Ericsson" Indicator Jacks, the automatic operation of clear out drops, and many special features not embodied in any other switchboard.

WRITE DEPT. B TO-DAY FOR FURTHER PARTICULARS

IT'S AN "ERICSSON" THAT GUARANTEES SUPREMACY

SAVES OPERATING EXPENSES

L.M.ERICSSON TEL.MFG.CO.

BUFFALO, N.Y.

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News from Operating Centres

CITY COUNCIL AT BEAUMONT, TEXAS, CONDEMNS BELL TELEPHONE SERVICE.

WHEN J. E. Farnsworth, of Dallas, Texas, vice-president and general manager of the Bell telephone company which operates at Beaumont, appeared before the city council in the latter place and practically admitted that the results attained by his operating department might be greatly improved he committed a most serious blunder. He said that the company's equipment was in first-class condition, so that any inefficiency was due to errors in operating.

Apparently this was no news to the city council, for things seem to have come to such a pass that the members were unwilling to even vote to give the company thirty days to remedy its services before reconsideration of the matter. The council therefore appointed a committee to investigate the service and report what preliminary steps are necessary by law to cancel the franchise of the Southwestern Telephone and Telegraph Company on account of its failure to give such service to the public as is required by its franchise. Another resolution was entered to discontinue the use of its telephones in the city departments and publish a notification that service to these offices will be obtained exclusively over the Independent lines of the Beaumont Telephone Company.

TELEPHONES RIPPED OFF THE WALLS WHEN FREE COUNTY SERVICE IS DISCONTINUED.

CITIZENS of Warrick County are not taking any very mild measures to express their disapproval of the course adopted by the Cumberland Telephone & Telegraph Company in the matter of cutting off free service to and from the exchange at Booneville, Ind. They say that the company has dealt unfairly with them as city and rural subscribers. When requested to remove its instruments it has not done so, and the citizens have in some cases thrown out the telephones themselves. The history of the situation shows that a few years ago, in order to obtain subscribers, the company promised to give free service to two or three outside counties. The free county service has brought it into difficulties before this, and the limitations placed upon it recently have been the cause of the present flare-up. Under the circumstances the company is in a rather difficult position in Booneville, as it has no franchise, and the company and the city council have been trying to agree upon terms for over a year without making very much progress. The company is held in very little esteem at the present time, and a number of prominent citizens have contributed $500 each toward the organization of an Independent company, to which the council will probably grant a franchise very promptly.

SPECIAL POLE TAX MEASURE PASSED TO FORCE BELL COMPANY TO OBTAIN FRANCHISE IN PASADENA.

FOLLOWING up the action of the Pacific Telephone and Telegraph Company in refusing to take out a franchise in Pasadena, Cal., the city attorney introduced an ordinance to the council which compels all companies using poles set in the streets or alleys to pay a license of $2 per year for every pole. The ordinance provides that this tax shall apply to all companies which do not take out a charter in the city and shall be collected in all cases where the companies do not pay the city 2 per cent. of the gross receipts of the business done in Pasadena. This provision of the ordinance exempts the Home Telephone and Telegraph Company from the tax, because under its city charter it now pays the city 2 per cent. of its receipts.

Under the programme now adopted by the council it is intended to compel the Bell company to pay the city for the privileges enjoyed. The city attorney says that the Supreme Court of the United States has upheld similar ordinances, holding that the tax is in the nature of a rental of the city streets.

Should the Bell company win its suit with the city of Pomona this new ordinance will face it and it will be compelled to pay the tax or take out a franchise. The Pomona suit is brought to compel the company to apply for a franchise.

It is estimated that the company has 4,000 poles in Pasadena, which would give the city an income of $8,000 and therefore probably be more costly than a franchise. The ordinance did not receive the full support of the members of the council, but the measure was finally passed on its first reading by the affirmative votes of all members excepting one.

It is possible that at the second reading of the ordinance the amount of the tax may be amended.

The city attorney has worked for weeks on this matter as he desires to take no chance of permitting the telephone company to escape payment for the privilege of doing business in Pasadena.

IN ABSENCE OF COMPETITION CITIZENS CANNOT ENFORCE BOYCOTT TO IMPROVE SERVICE.

BOYCOTTING telephone companies because certain regulations were unsatisfactory or because rates were considered too high recently proved a failure at several places in Tennessee and Kentucky. In a number of places in those states patrons of the Cumberland Telephone & Telegraph Company have tried the boycott plan this summer, but in each case the boycott failed because the patrons could not do without their telephones. At Port Royal a rigid boycott was declared, but the business men of the town found that the telephone was indispensable, and after doing without the service a week they ordered their telephones put in again. This started the service and the resident patrons soon joined and now the service is as extensive as ever. The Port Royal difficulty arose over what the patrons thought were excessive rates.

At Erin, Tenn., a similar case has just gone into history. The Cumberland company's rates were complained of, but after the patrons had done without their telephones for a while they found that almost any kind of rate was better than no service. Similar cases are reported from numerous places in Tennessee and Kentucky and all have ended alike. These cases merely prove that after one has become used to telephone service he can hardly get along without it. Many complaints of rates being too high are made before the patrons really know what telephone service is worth.

ANTI-RACE SUICIDE STIMULATES USE OF THEATRE TELEPHONE PAY STATIONS.

FROM Philadelphia comes the report that the youngsters left at home cause the telephone pay stations in the theatres to do a rushing business.

The manager of one of the largest theatres in the Quaker City states that the first question asked by nine out of every ten persons using the telephone before and during a performance, after securing connection is "How is the Baby?"

WHEN CONTROLLED BY BELL COMPANY THE CITIZENS OF CROWNPOINT REFUSE SUPPORT TO TELEPHONE EXCHANGE FORMERLY OWNED BY INDEPENDENTS.

AS soon as the Crownpoint Telephone Company, of Crownpoint, Ind., which was incorporated ten years ago and built up by local capital, began to have dealings with the Bell company it lost its hold on the local telephone business. A few months ago the Crownpoint Telephone Company informed its subscribers that they could obtain long distance connections over Bell lines, and at the same time notified them that they would have to pay fifty cents a month increase in rental.

No sooner was this announcement received by the subscribers than negotiations were entered into with the Northwestern Telephone Company, organized two years ago as a farmers' line

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AJAX—THEN AND NOW

NOT "NOW AND THEN" BUT "AJAX ALWAYS"

THEN—

Ajax, the strong, bold warrior, after the duel between Hector and Patroclus, stands defending the body of Patroclus. Jove enveloped the face of heaven with a dark cloud, the thunders roared and lightning flashed. Ajax, looking for a messenger to send and tell Achilles of his friend's death, exclaimed in those famous words of Cowper:

"Father of heaven and earth deliver thou
Achaia's host from darkness; clear the skies;
Give day; and since thy sovereign will is such,
Destruction with it; but, oh, give us day."

Jupiter heard the prayer and dispersed the clouds.

This Cut on All Genuine Ajax-Cells.

NOW—

There is something in a name. It does not make the article better, but it establishes a standard and in our Ajax Dry Battery is suggestive immediately of high strength, recuperative power, long life. All batteries are not alike. Because a battery is advertised to you in your every mail it is not better. You are paying for all that advertising. All quality in the Ajax, not one cent for the name. The battery on which we are willing to put our name, furnish with our Telephones and recommend to telephone exchanges. You want something better than the ordinary "Supply house" battery. You do not want to pay a fancy, factory-made price. Try a barrel under our special offer now, 15½ cents each in barrel lots, especially attractive yearly contracts. Order through our nearest office.

Central Telephone & Electric Company

Makers of High-Grade Telephone Apparatus

Main Office and Factory:
2131-37 LUCAS AVE., ST. LOUIS, MO.

Dealers in Telephone Supplies (Exclusively)

120 Liberty Street, New York City
237 Commerce St., Dallas, Texas

THIRD ANNUAL

ELECTRICAL SHOW

COLISEUM, CHICAGO

JANUARY 13th——25th, 1908

APPLY FOR SPACE NOW

Electrical Trades Exposition Co.

1006 Monadnock Block, CHICAGO

HOMER E. NIESZ, Manager

Annual Convention of the International Independent Telephone Association will be held in Chicago at the time of this show.

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through the eastern part of Lake county. The latter company is now seeking a franchise from the city council on the same terms as the one originally granted the Crownpoint exchange. A very large number of citizens have petitioned the council to grant the new franchise, believing that by so doing they will be able to get strictly Independent service, and avoid the exactions which are beginning to become evident as a result of the change in the control of the original company.

SUIT OF HOME TELEPHONE COMPANY VS. CITY OF LOS ANGELES, CAL., TO GO BEFORE SUPREME COURT EARLY IN OCTOBER.

THE suit of the Home Telephone Company against the city of Los Angeles, California, to determine the right of the telephone company to regulate telephone rates is expected to be heard in the U. S. Supreme Court during the first two weeks of this month. This case is one in which all of the telephone companies operating in that portion of the country are interested, and the decision will be watched for with much interest.

DIMONDALE, MICH., BUSINESS MEN OUST BELL TELEPHONES.

AFTER having had the opportunity of comparing the service of the Independent and Bell companies for the last three years the business men of Dimondale, Mich., have decided that the Independent service will answer their every need and have therefore signed the following agreement:

"We, the undersigned, business men of Dimondale, agree to contract with the Citizens' Telephone Company for a period of three years at the rate now in force, and to discontinue the Bell telephone service after October 1st, or as soon as our present contract expires."

This action by the business men, which was entirely unsolicited by the Citizens' Telephone Company, but which arises from the superior value of its service, will give that company absolute control of the telephone situation in the city of Dimondale.

ROCKY MOUNTAIN BELL OFFERS STOCK TO THE PUBLIC.

ONE of the effects attributed to telephone competition is shown in a recent announcement of the Rocky Mountain (Bell) Telephone Company, in Utah and Montana, that it is desirous of securing local investors as stockholders.

This offer is generally believed to be due to a desire to secure local influence against the inroads being made by the Independent companies into the telephone business which the Rocky Mountain has heretofore had practically to itself. The reason for this conclusion is that never before in the history of the company has the public been offered an opportunity to help participate in its profits when it had a clear field.

FEDERAL COURT IN NEW ORLEANS SAYS IT IS ALL RIGHT TO RAISE NIGHT RATES.

THE Cumberland Telephone and Telegraph Company (Bell) will be allowed to raise its night toll rates to the equal of the day rates in Louisiana without opposition from the Railroad Commission. The question of doubling the night rates has been heard before the Federal Court in New Orleans and the opinion of Judge Sanders indicated that if the Commission refused an increase in the night toll rates the court would allow the raise.

The Railroad Commission declined the request of the Cumberland Company, however, for permission to advance the rate to telephone subscribers served through submarine cables. It is likely that the telephone company will also carry this matter into the Federal courts in an effort to stop the interference of the Railroad Commission.

INDEPENDENT TELEPHONES ONLY FOR SCHOOLS AT McKEESPORT, PA.

AT a recent meeting of the building committee of the McKeesport Board of Education the matter of telephones in the public schools was brought up for consideration. The committee recommended to the Board that the secretary be instructed to notify the Bell telephone company to discontinue its telephones in the various school buildings of McKeesport, and provided that the Pittsburgh & Allegheny Telephone Company's service shall be installed.

ONTARIO RAILWAY AND MUNICIPAL BOARD ISSUES TELEPHONE SPECIFICATIONS.

SPECIFICATIONS fixing the standard measurements for telephone systems to be installed under the act respecting local municipal telephone systems, and the erection and construction of such systems have recently been issued by the Ontario Railway and Municipal Board. Copies of these specifications may be secured free of charge by operating companies in the province of Ontario or those interested upon application to Hon. James Leitch, Chairman of the Board, at Ottawa, Ontario, Canada.

ELECTRICITY BUILDINGS, VICTORIA BRIDGE,
Manchester, England.

American Telephone Journal,
New York, N. Y., U. S. A.

Gentlemen:—

In reply to your letter of the 27th inst., I had quite overlooked the matter of the renewal of my subscription and now enclose money order for $3.

I am obliged to you for continuing my name on the subscription list, as I consider your JOURNAL *so valuable a publication on the subject of telephony that I should not like to miss a number.*

Yours truly,

P. P. KIPPERY.

MANAGER OF INDEPENDENT LINE INSTALLS LONG SPANS AT ARCATA, CALIFORNIA.

EXTENSIONS of the lines owned by J. H. Blake at Arcata, Cal., which have recently been made, involve some very interesting features of construction work. Where the lines cross the Mad river at Blue Lake it was necessary to make two spans of about 2,000 ft. each. A cut-out is provided near the terminals of each long span, so that if it should happen to break during bad weather the subscribers may disconnect the grounded portion of the line and use the balance without difficulty. Mr. Blake reports that all of his rural lines are filling rapidly, and since the telephone has been put in business has improved so much that people are very much pleased with the service.

MEXICAN INDEPENDENTS CONSOLIDATING.

THE Ericsson (Independent) Telephone Company of Mexico City has announced that connection has been made with the lines of the Telefono Comercia Company running into Toluco. Considerable progress is also reported in installing stations in various suburbs of the city, including Hidalgo, Guadalupe, Tacubaya and San Angel.

The test is now being made of laying telephone and telegraph wires in the same underground conduits. If the success of the project in the light of local conditions is established, it is said that all telegraph wires in the capital will go in these conduits.

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MONEY TALKS

$1,000.00 in Cash

Will be presented to the International Independent Telephone Association by the AMERICAN TELEPHONE JOURNAL, when a certain monthly telephone paper gives its Post Office receipts for its August circulation to the President of the Telephone Manufacturers' Association.

AMERICAN TELEPHONE JOURNAL makes this offer for two reasons: The International Association needs the money to carry on its good work, and—

The paper in question is trying to cloud the issue and throw dust in its advertisers' eyes by loud talk about its September circulation.

September circulation figures were *not* asked for by the Telephone Manufacturers' Association.

Instead the Telephone Manufacturers' Association *requested the August figures* on the 19th of August.

Why did this monthly paper decline to give its August Post Office receipts?

Why did it wait until September 13th—Friday at that—and then give its Post Office receipts for the month of September?

Why were its boasted *affidavits* dated **Friday, the 13th** of September? Fateful day!

Why does this monthly paper say in a public circular that it "*at once* responded" to the request of the Manufacturers' Association, when nearly a month intervened between the Manufacturers' request and the response of this particular paper?

And it did not give *August* receipts or make an *affidavit* for *August* circulation.

Was it afraid to do so?

We quote below a paragraph that appeared recently in the monthly referred to, in speaking of itself:

"Either ———— is the most colossal fraud of the telephone industry, or it stands head and shoulders the highest. . . . . We ask you to kindly study the situation carefully and determine for yourself."

What is the answer?

What are telephone advertisers to assume after "kindly studying the situation carefully?"

Can this paper prove an August Circulation of 4,000 copies? Was the *bona fide* September circulation 4,000?

Is it not likely that subscribers, advertisers and exchange copies of this publication for September would have been mailed either before or on the first day of September?

Why, then, were only 3,656 copies of this paper's September issue mailed on August 31?

(This paper claims its September issue weighs a little less than a pound. As a matter of fact it weighs exactly 1 pound.)

Is it not fair to assume that this is the bona fide and regular monthly mailing list (excepting Chicago and Foreign) of this monthly publication?

Thirteen hundred copies had to wait to be mailed until September 4th—five days.

It is incredible that subscribers or advertisers would wait so long for the receipt of their paper. We know AMERICAN TELEPHONE JOURNAL'S would not.

And, then, exactly 3,002 copies—by the paper's own Post Office receipts—were not mailed until September 10, 11 and 12. A few copies we find were mailed in the interim on September 5, 31 copies, and September 6th, 12 copies, to be exact.

We ask advertisers, do not these returns have at least a *suspicious* appearance?

Does it not appear that the boasted 10,000 September circulation has all the ear marks of being deceptive, and created for the purpose of hoodwinking advertisers?

Compare such circulation statements with the straightforward action of AMERICAN TELEPHONE JOURNAL in *immediately* forwarding its August Post Office receipts to the President of the Telephone Manufacturers' Association. We didn't take to the tall timbers when August figures were requested, and then get up a big special September issue.

We did not pick the month. The Telephone Manufacturers' Association raised the issue without warning.

We proved 30,244 circulation for August (over 6,000 each week) by Post Office receipts and affidavits, too—all now in the hands of the President of the Telephone Manufacturers' Association.

DON'T FORGET!

$1,000.00 in cash will be presented to the International Independent Telephone Association by the AMERICAN TELEPHONE JOURNAL when this monthly telephone paper gives its Post Office receipts for its August issue to the President of the Telephone Manufacturers' Association.

The International Association needs the money, and AMERICAN TELEPHONE JOURNAL will gladly give this $1,000 so that advertisers may know the true circulation of this monthly paper.

ASK FOR AUGUST CIRCULATION

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Explicit Answers to Practical Questions

THE POTENTIOMETER.—(925.)

In your Queries and Answers page a few issues back you described an instrument for measuring the insulation resistance of telephone lines and stated that this instrument might be calibrated with a potentiometer.

As I am unaware as to the form and uses of the potentiometer I will be indeed grateful if you will describe it in the pages of your valuable paper at an early date or communicate personally with me.

Trusting that I am not imposing upon your good nature too much in making this request and thanking you in advance for the information, I am, yours truly, J. C. B., Fla.

The potentiometer is an instrument for the galvanometric measurement of electromotive forces or differences of potential

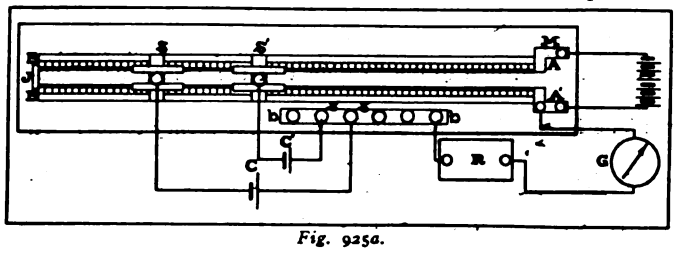

Fig. 925a.

by a zero method. In the potentiometer the difference of potential to be measured is balanced or opposed by a known difference of potential, and the equality of the balance is determined by the failure of one or more galvanometers, placed in shunt circuits, to show any movement of their needles.

The construction of the instrument is as follows: Referring to Figure 925*a*, *A B B' A'* is a long fine bar wire, preferably of German silver or platinoid or some metal having a small resistance temperature coefficient: The length of this wire sh ould be about 79 inches and marked off on a scale marked off into 2,000 divisions. The ends of the wire are connected through an adjustable resistance with the secondary battery *B*, generally of two cells having a very constant E. M. F. The resistance of the wire should be at least 40 ohms, in order that the current flowing through it under a pressure of 4 volts may be only a fraction of an ampere. The wire must be of uniform diameter throughout its entire length so that the fall in potential down the wire per division of length will be the same at all parts of the wire. The current through it is then to be adjusted to a standard value in which the fall in potential down through the 2,000 divisions of the length of the wire is exactly 2 volts. This may be done with a standard cell (preferably Clark's) and a variable resistance. A Clark standard cell *C*, supposed to be at a temperature of 59° Fahrenheit, has its positive pole connected, through a sensitive galvanometer *G*, with that end of the divided wire in connection with the positive pole of the working battery *B*. The other pole of the cell is connected to a slider *S*, which makes contact with the wire at any desired point. The slider is first moved to touch the wire at 1434 divisions from the positive end, and a resistance in series with the potentiometer wire and battery is then varied until the galvonometer shows no current through. When this is the case we know that the fall of potential down the 1434

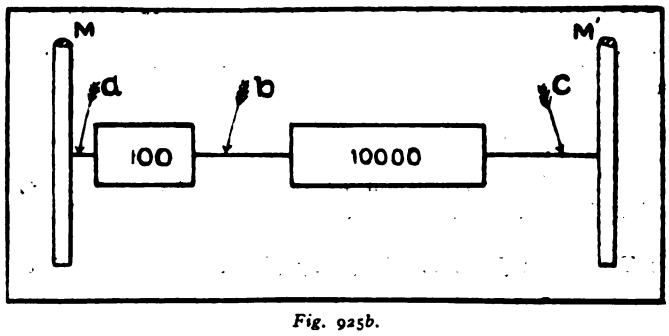

Fig. 925b.

divisions of the wire, due to the working battery, must be equal to the E. M. F. of the Clark cell, which is 1.434 volts at 59° Fahrenheit. The potentiometer is then said to be set for use. Suppose, then, that we desire to measure the electromotive force of any other voltaic cell *C'*. We substitute this cell for the Clark cell and find a new position *S'*, to which the slider must be moved, so that the galvanometer *G* indicates no current. Suppose that it is at 1920 divisions on the scale, then we know that the E. M. F. of the cell *C'* is 1.920 volts.

Again, suppose that we require to measure a continuous E. M. F. or potential difference of 100 volts or some such value. We connect across the terminals or ends of the circuit, between which exists the potential difference to be measured, a wire of high resistance, say of 10,100 ohms. A connection is made to the ends of a fraction of this, which may be, for instance, 100 ohms, or one one-hundredth of the larger resistance. Thus, if there exists a potential difference of 101 volts at the extremities *a c* of the whole wire, as shown in Fig. 925*b*, of 10,100 ohms resistance, the potential drop down the 100 ohms *a b*, in series with the resistance of 10,000 ohms, will be one volt. If we measure, as just described by means of the potentiometer when set for use, the drop in potential down this one hundredth of the resistance, we know that the whole potential difference between the ends of the wire must be just 101 times as great.

The divided resistance, therefore, enables us to measure on the potentiometer any voltage by measuring a known fraction of it as described.

The potentiometer is also an exceedingly useful instrument for calibrating other direct-reading instruments, or instruments which show directly, on a scale, current or voltage values.

CABLE DATA.—(926.)

We are desirous of securing some information in relation to the sizes of lead-covered cable, that is the outside diameter. We have several cases where it will be necessary to run lead cable through iron pipes, and as it will be a case of economizing on space as much as possible we wish to know how to figure to advantage. W. H. K., Ala.

.08 M. F.						
No. Pairs	No. 19 B. & S.		No. 20 B. & S.		No. 22 B. & S.	
	Lead Thick.	Diam.	Lead Thick.	Diam.	Lead Thick.	Diam.
20	1/16	1,134	7-64	1,032	3-32	860
25	1/16	1,169	1/16	1,100	7-64	928
50	1/16	1,530	1/16	1,427	1/16	1,251
75	1/16	1,822	1/16	1,684	1/16	1,461
100	1/16	2,063	1/16	1,907	1/16	1,632
125	1/16	2,268	1/16	2,102	1/16	1,805
150	1/16	2,457	1/16	2,269	1/16	1,943
175	1/16	2,630	1/16	2,423	1/16	2,080
200	1/16	2,784	1/16	2,578	1/16	2,200
300	..	....	..	....	1/16	2,630

Table 926.

The figures shown in Table 926, which indicate the approximate outside diameter in mils of the cables more commonly used in telephone construction, will undoubtedly prove to be just what you desire.

As the mil equals one one-thousandth of an inch you will have no trouble in converting these figures into inches.

INSULATION TESTS WITH VOLTMETER.—(927.)

Kindly advise us how to make insulation tests with a voltmeter? Our voltmeter is of the standard Weston portable type and on one of our lines when we apply a circuit having 220 volts we get a reading of four and one-half volts on the voltmeter. What resistance does this denote between our wires and how do you figure it? H. M. T.

In this problem we would determine the insulation resistance by the drop of potential method the same as in measuring the resistance of any conductor with a voltmeter, only the resistance of the insulation takes the place of the customary resistances measured. The insulation resistance, which we call x, will be to the resistance of the voltmeter R as the volts drop in x is to that in the voltmeter. The drop v in the voltmeter is given by its reading, and as the impressed electromotive force V is known, the drop in x will be $V-v$. Therefore the following proportion obtains:

(*Continued on page 226.*)

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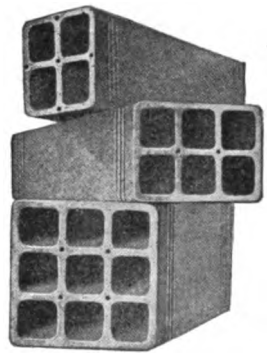

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Telephone Patents Just Issued

AUTOMATIC TELEPHONE RELEASE.

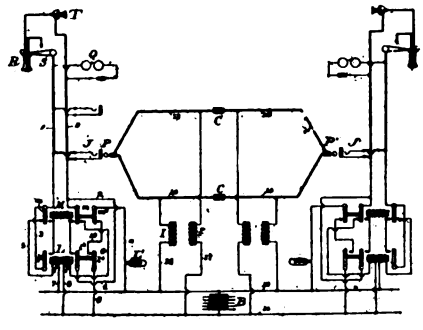
E. D. Fales, Chicago, Ill., patent 866,639, Sept. 24, 1907, assigned to Automatic Electric Company, Chicago.

This invention covers a system of relays and circuit arrangements associated with automatic telephone systems in which the selectors or automatic trunking switches are released over a third trunk conductor. Its object is to cause the release of all selectors at practically one time instead of one after another in a train. This object is effected by connecting the release relays of all the selectors in series with the release magnet of the connector, so that only one long trunk release circuit is employed. In other words, the trunk release circuit extends from the non-grounded pole of the battery through the release magnet of the connector, thence back through the release relay of the second selector and through the release relay of the third selector and thence to ground, whereby all selectors are released simultaneously upon the hanging up of subscriber's telephone receiver. The reason for this action is that the hanging up of the receiver effects a closure of the trunk release circuit at the connector, thus bringing the battery and release magnet of the connector into a trunk release circuit, in which they are in series with the release relays of all the selectors.

TELEPHONE EXCHANGE SYSTEM.

Edward E. Clement, Washington, D. C., patent 867,014, Sept. 24, 1907.

This invention relates to an arrangement of terminal apparatus at the exchange end of the subscriber's line circuit, so that the

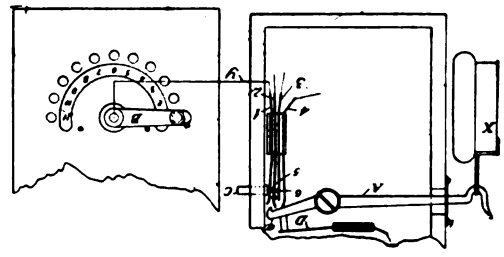


line and talking circuit will be disconnected from battery circuit excepting through the cord circuit when connection is established. Upon removal from the hook of the receiver R line relay L is energized and attracts its armatures l^2 l^3 l^4, line lamp L^1 is lighted and current is caused to pass through cut-off relay M. This, however, does not attract its armatures, owing to the shunting effect of the line to sub-station and of the resistance of windings 1, l^1. When the subscriber plugs in the amount of current through relay M is augmented and it attracts its armatures, cutting off line relay from the line and opening line lamp circuit. At the same time relay M is permanently bridged across the line and held in an operative position by current passing through the cord strands until the operator disconnects. In answering the call line lamp L^1 is not made to glow, as relays L and M operate practically at the same time.

INTERCOMMUNICATING TELEPHONE.

C. E. Lee, Chicago, patent 866,794, Sept. 24, 1907, assigned to Electric Goods Mfg. Company, Boston, Mass.

In the accompanying sketch, showing apparatus in an operative position, spring 1 is connected by wire y to switch arm B, which is adapted to make connection with wires of other individual stations terminating on buttons 1, 2, 3, 4, etc. Spring 2 connects with talking circuit, spring 3 with the home or station circuit



wire and spring 4 is the terminal of the battery for ringing. When receiver is removed from the hook the latch a engages spring 2. Pressure upon push button C causes spring 1 to be advanced by the latch into contact with spring 2 and there locked in position. Continued pressure upon the push button forces spring 2 into contact with spring 4. By means of this connection from spring 4 through 2, 1 and wire y, ringing current is transmitted to the desired station, spring 3 being temporarily disconnected. Releasing the push button C leaves the contacts closed for talking, and hanging up the receiver releases the springs.

TELEPHONE SYSTEM.

H. P. Clausen, Chicago, patent 866,714, Sept. 24, 1907, assigned to American Electric Telephone Company, Chicago.

This patent, for which application was filed in 1901, covers a telephone system having a cord circuit of the common battery repeating coil type, with supervisory relays. Normally each side of the line circuit passes to an armature of the cut-off relay, the tip strand being connected to ground and the ringing strand in series with line lamp, line relay and negative battery. The operation of the line relay short circuits the two line springs of the cut-off relay, thus making the resistance of the lamp circuit from battery to ground independent of the line resistance, giving it a steady illumination. The winding of the cut-off relay is connected between the sleeve of the jack and ground. As the sleeve of the plug is connected to negative battery its insertion operates cut-off relay, disconnecting the multiple contacts associated with the armature from ground and local signalling circuits respectively, and connecting them to tip and ring springs of the jack.

INSULATION TESTS WITH VOLTMETER.—(927.)

(*Continued from page 225.*)

$$x : R :: V - v : v$$

$$\text{and } x = \frac{V - v}{v} \times R,$$

As your voltmeter is of the standard Weston portable type the resistance R will be about 17,000 ohms. V is your 220 volts applied to the line, and v equals your reading obtained, 4½ volts. Then applying the preceding formula we have

$$x = \frac{220 - 4\frac{1}{2}}{4\frac{1}{2}} \times 17{,}000 = 812{,}960 \text{ ohms. or } .81296 \text{ megohms,}$$

as one megohm is equivalent to one million ohms.

While this is not a particularly high insulation for an ordinary subscriber's telephone line, yet it is sufficient to assure satisfactory transmission.

The voltmeter is not generally used for insulation resistance tests as no reading is obtained if the resistance exceeds more than a few megohms. In your own particular case your voltmeter will indicate no flow of current when the resistance is 3.74 megohms or over. However, you can assure yourself that local lines on which you can get no reading under the conditions stated in your query are sufficiently well insulated for all purposes of practical telephone operation.

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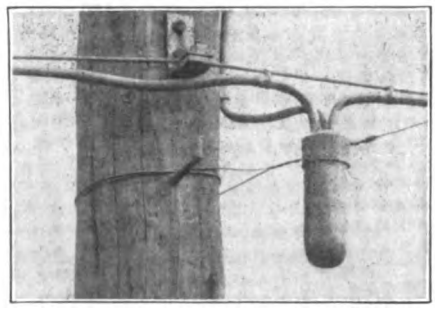

A COMPLETED
Hargis Cable Splicing Joint

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differs only in appearance, the principle remains the same as the old style wiped joint. Its position in regard to the cable and messenger wire is practical. First, because the joint is on top, and therefore easier to inspect; and second, because when the splice is opened the conductors hang downwardly and are in a more accessible position. The pouring of the solder is very simple. There is no wiping necessary. In the old style Horizontal Wiped Joint both ends must be soldered and carefully wiped. This requires a knowledge and skill which many otherwise good cable men do not possess.

The position of the conductors is more practical for boiling out (simply immerse the exposed conductors in a pot of hot paraffin); it is more practical because of the greater ease in tagging the wires for conductor assignments and also for splicing.

The splicing of the individual pairs is identical with the old method, except that the paper sleeves are put on after the wires are spliced.

You will see from the above that any cable man is very well acquainted with the principles of this device. The difficult and objectional features of the Horizontal Joint are eliminated. Everything else remains the same, except the position of the Joint.

If you are considering new cable construction or changes in your cable plant, you should write us at once for information, prices, etc., on the Hargis Joint. They will save you time and money. You will improve your cable construction.

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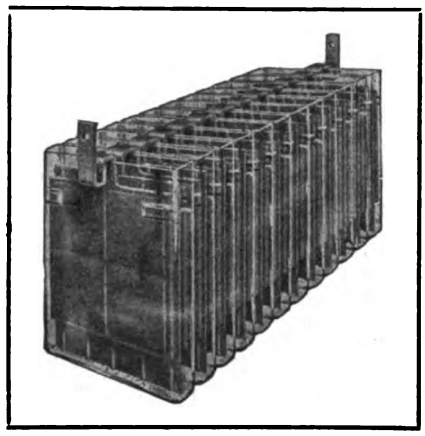
What the Manufacturers Are Doing

A NOVEL METHOD OF SEPARATING STORAGE BATTERY PLATES.

TO all who have had occasion to use storage batteries the question of separating the plates is a most serious one. Different kinds of wood treated with different kinds of acid have been employed; different kinds of rubber, perforated, bent, ribbed, single and double, have been used with and without additional wood separators; glass rods and wood rods have been used alone and in combination with some of the other methods in order to satisfactorily solve the question of obtaining a proper separation between the battery plates.

When small amounts of current are required, as in operating police, fire alarm, railway signals, telegraph and private telephone exchanges and the like, this problem has been very cleverly solved in the novel design gotten up recently by the Gould Storage Battery Co., New York City, and termed the Gould Tandem Couple Type Cell. The settlement of the question of what kind of separator to use is now unnecessary, as in the new design no separation is needed whatever.



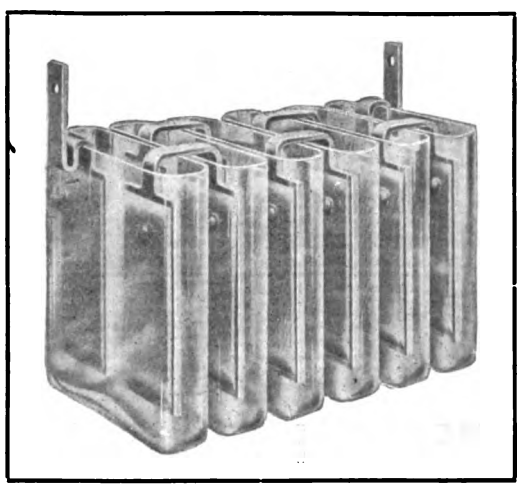
Twelve Cells Gould Couple Type Battery, Assembled.

The essential characteristic of this new cell is that the plates are set end to end in each cell, one positive plate and one negative plate only being put in each glass jar.

With the plates placed end to end, the discharge takes place from both sides of the plate and from practically all parts of the plates at once, as the current rate is very low for this class of work. This construction eliminates the chance of grounding or short circuit between plates, for which there is more or less chance when plates are placed side by side.

A striking advantage of this new design and one which will appeal to the operating man as a distinct time saver, is that the removal of any couple for inspection, cleaning or renewal, is not attended by the old-time unbolting of connections, sawing of lead, the accompanying lead burning outfit, etc. The positive plate of one cell is lead burned to the negative of the next cell, no bolted connections being used whatever except at the end of the rows. This insures perfect contact between all the cells and eliminates all chances of the circuits being interrupted on account of poor connections—a point of considerable importance.

This method of grouping at the same time greatly facilitates the replacing of any couple with the minimum possible interruption to the circuit, the changing of all groups in the set being a matter of only a few minutes, as there are practically no connections to unbolt and no separators to remove and replace. This method of grouping is a money saver on first cost as well as on maintenance, because it has done away with the use of separators for this class of work, thus cheapening and simplifying the construction of the battery.



Gould Tandem Couples.

TIME SAVING POINTERS.

TELEPHONE men who want to show prospective patrons the value of the telephone as a time saver, and, as a frequent consequence, a money maker, and often a life saver, should lose no time in sending for the latest book issued by the Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y. In this book the company's advertising department has produced something which is decidedly worth while from every standpoint. It contains several pages of good common sense pointers which a manager can put up to business men and house owners as final arguments to clinch an order for telephone service, and these are put together in the book in such a way as to make very interesting reading. The text of the book is emphasized by illustrations which show conclusively that the telephone field offers an opportunity for the exercise of the most skilful efforts in the making up of books giving valuable information about methods of using the products of manufacturing companies. Each of the illustrative designs, by its thoroughly natural appearance, drives home a practical point, at the same time emphasizing the text and illuminating the pages of the book.

The final pages of the book are devoted to information concerning the company's branch exchange telephone service, with a brief reference to its apparatus for intercommunicating systems. It will be mailed free to all telephone managers who are interested in branch exchange systems. They should ask for booklet No. 80.

THE BLAKE SIGNAL & MFG. COMPANY, 246 Summer street, Boston, Mass., will have at the Convention of the American Street & Interurban Railway Association, at Atlantic City, October 14 to 18 inclusive, a complete working exhibit of standard signal apparatus for use in connection with electric railway systems. The company will show various types of railway telephones, together with standard blanks, etc., for use in handling trains by telephone. A thoroughly competent train dispatcher will be on hand to give information concerning the practical working of the Blake system. The company will also be represented by E. J. Burke, president; C. C. Blake, vice-president, and George S. Hastings. It will occupy Spaces No. 228 and No. 230.

MR. H. R. SYKES, General Manager of several Independent telephone operating companies in Ohio, will join the sales organization of The Wire & Telephone Company of America during the present month. His long experience in the telephone field will prove a valuable asset in that it will be comparatively easy for him to convey his impressions of the excellent features of the "Easophone" equipments to exchange managers and subscribers. The Easophone equipments and its telephone wire and supplies are being used so generally that it has been necessary to materially enlarge the sales organization of this progressive company.

THE NORTH ELECTRIC CO., Cleveland, Ohio, recently closed a large contract with American Union Telephone Co., of Harrisburg, Pa., for North "Synchromonic" apparatus, which will be installed in a great many of the company's leading exchanges.

F. BISSELL CO., Toledo, O., gives full directions for installing "Novelty" potheads in a circular which has recently come off the press. The company states that these potheads make it easy for a workman of average ability to make a good splice. The company will send this information upon receipt of a request.

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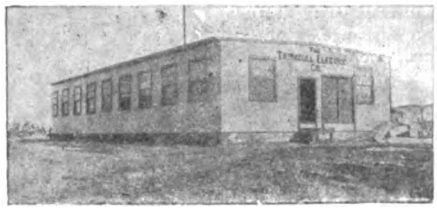
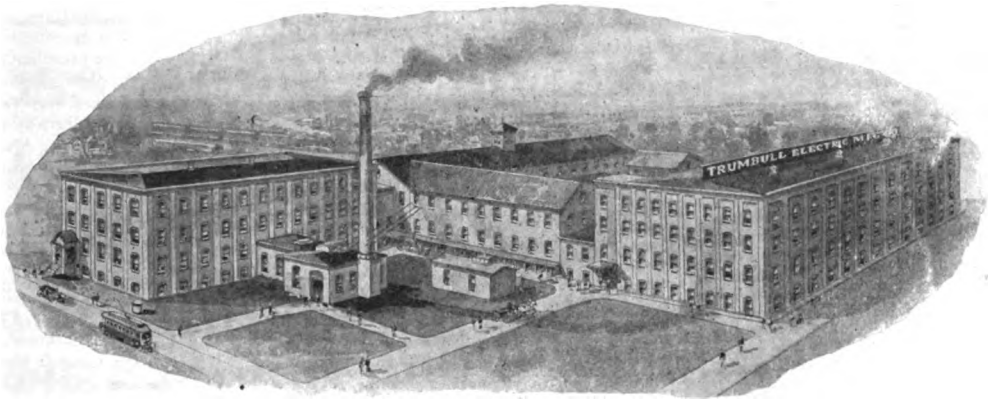
The Growth of the Trumbull Switch Factories

THE success which attends the manufacture of a meritorious product when marketed by men having sound business judgment could hardly be more clearly shown than by the accompanying illustrations of the plants of the Trumbull Electric Mfg. Company, of Plainville, Conn. The upper one represents the small factory in which the company began business on February 1st, 1899; and the lower represents the large plant, which is the outgrowth of this successful beginning. This company was organized in 1899 with the following officers: Frank T. Wheeler, president; John H. Trumbull, treasurer, and Henry Trumbull, secretary. The early days were times of strife, but the practical mechanical and business ideas of the founders of the company made it forge rapidly to the front, and to-day there is no need of describing the Trumbull switches to telephone men. The product of its factory is now sent out not only to all parts of the United States but to many foreign countries; and sometimes the orders are so large, as in the case of one recently from San Francisco and another from the Philippines, that a whole carload of switches is sent to one city at a single shipment. In order to manufacture all the sizes and types of switches and keep up to its orders properly the company carries on hand a stock of 200,000 lbs. of copper and brass. In the receiving room and store room are bins for keeping knife switch parts. To accommodate the complete stock of parts necessary for the company's entire business no less than 4,700 of these bins are required. The entire factory is divided into departments so arranged as to permit of the most efficient and economical handling of the process of manufacturing switches from the start to the completion of the operation.



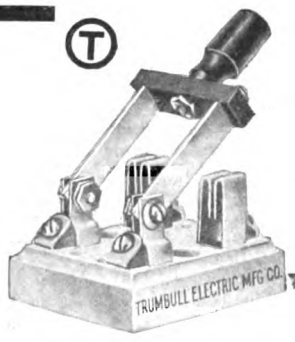
The Original Trumbull Switch Factory.



The Present Plant for the Manufacture of Trumbull Switches.

The employment of skilled workmen and careful inspection of assembled products are assigned as principal reasons for the success of the company and its very rapid growth.

TRUMBULL TELEPHONE SWITCHES



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710	D.P.D.T.	.50	50

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One was put in his **office,** the other in his **bedroom.**
He was **proud** of his **Easophones.**
He showed them to his friends.
The **demand** was thus **created.**
The manager reaped the harvest.
The **increase** in **revenue** from **additional** subscriber's stations followed.
History repeated itself.
The manager told other managers,
and now
The Easophone is the best contract agent in the business.

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Manufacturers of Telephones, Telephone Supplies, Bare Copper and Magnet Wire

JRNAL when writing to ADVERTISERS.

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Short Items of Interest

NEW COMPANIES.

MADISON STATION, ALA.—A new telephone company is being organized in this city by J. Williams and L. S. Hager. An exchange is to be established, and lines built to Triana and other points. Connections are also to be established with Huntsville.

WINONA, MINN.—Articles of incorporation have been filed by the Homer Rural Telephone Company, of this city. It has an authorized capital stock of 5,000 and the incorporators are Lloyd Barber, O. S. Bundy and J. H. Johnson.

LEICESTER, N. C.—The Leicester Telephone Company, which expects to erect and maintain a telephone system in Buncombe and Madison counties, has been incorporated. The capital stock is given at $5,000, but the company is given the privilege of beginning business with $500. Among the incorporators are T. F. Reynolds, H. W. Gilbert and others.

GRAFTON, N. D.—An Independent telephone company, to be known as the Martin Township Rural Telephone Company, has been organized with James Hanson, president; Frank McAulley, treasurer; O. A. Rod, secretary; Theo. Nelson, J. W. Rogers and O. B. Knudson, directors. Others interested in the company are Charles Fredland, John Hallen, O. O. Uggerud and R. Jorgenson.

OKLAHOMA CITY, OKLA.—The Oklahoma Central Interurban Railway Telegraph, Telephone, Light and Power Company, with a capital stock of $5,000,000, has been incorporated and expects to build a telephone line across the State. Its main offices are to be located at South McAlester and Oklahoma City. Among the incorporators are C. D. Freeman, of Denver; Leon Brown, St. Louis; B. F. Sharp, Memphis, Tenn.; G. M. Watson, Nevada, Mo.; Louis Landman, Jefferson City, Mo.; R. X. Wade, J. B. Boucher, F. M. Stone and H. H. Godington, Weatherford.

RIDGETON, OKLA.—The Ridgeton Telephone Company has filed articles of incorporation. Its capital stock is placed at $2,500 and the following directors have been elected: J. W. Spencer, J. R. George, Lymon Burbe, J. T. Wakefield, J. T. Funston, Ridgeton, D. N. Wright and H. G. Wright, of Harrington.

HOOVERSVILLE, PA.—A new telephone company, to be known as the Shade Telephone Company, has been organized by the farmers in Shade township, Somerset county. Its lines are to extend throughout Shade, Paint and Quemahoning townships, with connections at Hooversville. The capital stock is $1,000, and the following officers and directors have been elected: President, James E. Berkebile; secretary, Luther Croyle; treasurer, Charles A. Wagner; directors, A. J. Berkebile, Howard Powell, W. L. Powell, James A. Buchanan and Charles A. Wagner.

RINGGOLD, PA.—The Ringgold Telephone Company, whose object it is to construct a telephone system from Ringgold to Smithsburg, has been incorporated. The capital stock is placed at $500, and the incorporators, who also constitute the board of directors, are as follows: Jos. M. Newcomer, Charles M. Leiter, E. Keller Mentzer, Denton Martin and Barry G. Sheiss.

LUBBOCK, TEXAS.—Among the newly organized Independent telephone companies is the Staked Plains Telephone Company, whose intention is to construct and maintain a telephone system in several counties adjoining Lubbock. It has an authorized capital stock of $60,000 and the incorporators are C. W. Alexander, George T. Curtis and R. C. Burns.

HAMBURG, WIS.—A telephone company is being organized by the farmers of this city, with the intention of installing a local system.

SHELL LAKE, WIS.—Plans are under way for the formation of an Independent telephone company, which intends to erect a line from Shell Lake to Clam River.

PINEDALE, WYO.—Plans are being discussed for the formation of a new telephone company which has for its object the erection of a telephone line between Pinedale and Rock Springs. Those interested in the project are Charles Stevens and L. S. Trapp, of Boulder, and they expect ultimately to extend the system throughout the entire northern country, taking in South Pass and Lander.

VANCOUVER, B. C., CAN.—An Independent telephone company has been subscribed for here, and all the stock sold, for the purpose of building a telephone system in Vancouver to compete with the British Columbia Telephone Company. A charter is now being applied for.

FRANCHISES.

POCATELLO, IDAHO.—An Independent telephone franchise is being applied for in this city by J. M. Rich, who represents a syndicate of Salt Lake City and Ogden men. Another application is also being considered by the city council for Arthur D. Coon, representative of the Utah Independent Telephone Company.

FINANCIAL.

ATLANTA, GA.—An application for a permit to issue $2,000,000 improvement bonds, $1,000,000 at once and $1,000,000 at some future date, has been filed by the Atlanta Telephone and Telegraph Company with the railroad commission.

MORRISON, ILL.—The Whiteside Farmers' Mutual Telephone Company is considering the advisability of increasing its capital stock from $10,000 to $20,000 and the directors have also been asked to vote upon the question of changing the name to the Whiteside Mutual Telephone Company.

ROCK GROVE, ILL.—The Rock Grove Farmers' Mutual Telephone Company has increased its capital stock from $1,200 to $6,000.

ELECTIONS.

HILLSBORO, ILL.—The newly elected directors of the People's Mutual Telephone Company have chosen the following officers: George D. Taylor, president; M. L. Moyer, of Hillsboro, vice-president; Robert P. Barnard, secretary and general manager; A. K. Vandiver, treasurer.

LAFAYETTE, IND.—The directors of the Lafayette Telephone Company are O. P. Friberg, William S. Baugh, E. V. Burt and W. R. Wood.

SYRACUSE, N. Y.—The following officers have been elected by the New York Telephone Association: President, I. H. Griswold; vice-president, Wilbur H. Johnson, Buffalo; secretary, R. Max Eaton, Niagara Falls; treasurer, G. R. Fuller, Rochester; executive committee, J. T. Bellanger, George B. Wright, Williamsport; I. H. Griswold, Albany; Wilbur H. Johnson, Buffalo, and C. H. Poole, Utica.

REITZ, PA.—The following officers have been elected by the Central Telephone Company: President, A. R. Wagner, of Buckstown; secretary, Washington Custer, Reitz; treasurer, B. F. Lambert, Lambertsville.

LENA, WIS.—At a recent meeting of the Farmers' and Merchants' Telephone Company the following officers were elected: President, J. N. Bassett; vice-president, J. P. Brazeau; treasurer, J. C. Grant; secretary, John Ankerson; manager, Carl Schoenebeck. The above named, with Tony Kadlee and Peter Peetz, constitute the board of directors.

MISCELLANEOUS.

MUSKOGEE, I. T.—Owing to the alleged poor service being rendered by the Pioneer (Bell) Telephone and Telegraph Company, the citizens are endeavoring to have the council cancel its franchise and authorize the formation of a new company, to be owned and operated by home people.

GLASGOW, KY.—Acting in the interests of the Home Telephone Company, Messrs. Travis Taylor and W. R. Gardner, of Morgantown, Ky., are placing before the citizens a proposition to install a $10,000 telephone system if the citizens of that place will raise half the amount. Already about $2,500 has been subscribed, and the new concern is expected to commence business about the first of the year.

MOUNT STERLING, KY.—The Mount Sterling Home Telephone Exchange has the Bell company so thoroughly beaten at this place that a short time ago some locally owned Bell stock was traded for an interest in a livery stable. There are now 527 Independent telephones in use here as against 75 Bell instruments.

ALBION, MICH.—Plans are being considered at this city for the installation of an Independent telephone plant. Edmund Land, a consulting engineer of Grand Rapids, and L. C. Smith, secretary of the Home Telephone Company, have been interviewing the business men of the place. The financial plans for the project are now under consideration and it is quite probable a franchise will be asked for. The promoters contemplate the installation of a thoroughly modern system in every respect, including underground wires in the business portion of the city and all-cable system in the residence portion, with a common battery multiple switchboard of the latest type.

ONEIDA, N. Y.—On account of the increase in rates by the Central New York Telephone Company it is expected that an Independent telephone company will be invited to enter the city to operate in opposition to the Bell company.

WAYNESBURG, PA.—The State Mutual Telephone Company, of this city, has just closed a deal whereby it obtains possession of the property of the Federal Telephone Company in Canonsburg, South Canonsburg and Houston. By this arrangement the State Mutual Company will be in a position to furnish service down the Chartiers valley at a much earlier

WANTED – SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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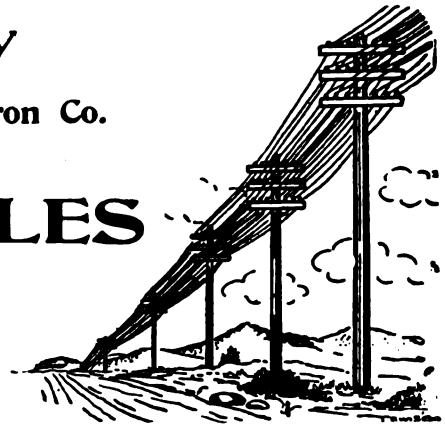

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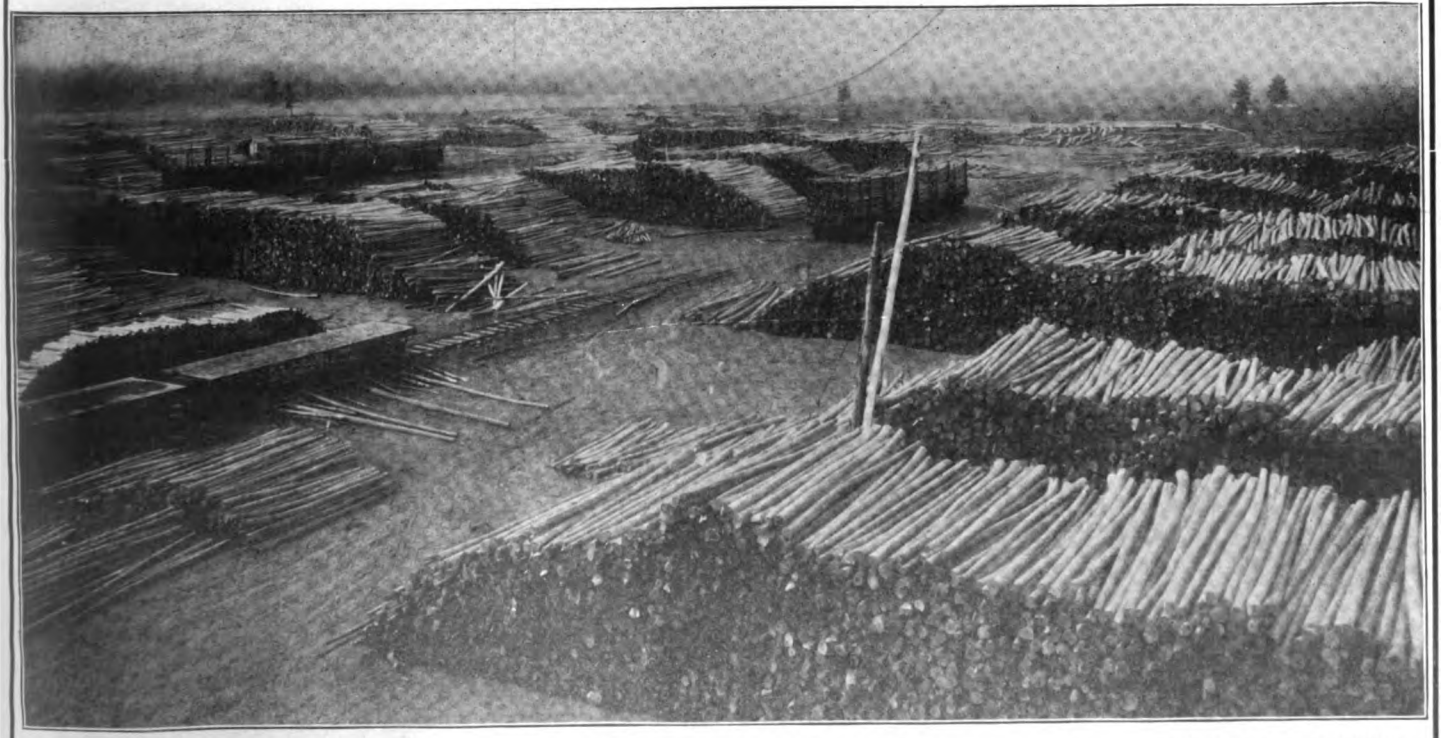

WE ARE NOW NAMING VERY ATTRACTIVE FIGURES.

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Short Items of Interest

date than was expected. The consideration in the sale was approximately $5,000.

PALMYRA, WIS.—The Eagle Telephone Company, which is making many improvements in its plant, contemplates the purchase of the High Company's telegraph lines, known as the Merchants' Telegraph, which extends from Genesee to Whitewater. Through this acquisition the Eagle Company expects to take all of its lines from the Bell company, and to use its own exclusively.

PERSONAL.

RALPH J. ELDRIDGE has been promoted from the position of manager of the New England Telephone & Telegraph Company's exchange in Palmer, Mass., to the office at Brattleboro, Vt.

J. L. HOSEA, who has become well known to many Independent telephone men of Indiana through his long connection with the New Long Distance Telephone Company at Indianapolis, has recently been appointed manager of the Citizens' Telephone Company at Columbus, Ind. Mr. Hosea, during the seven and a half years he spent with the New Long Distance Company, had an experience which gave him an exceptionally thorough fitting for taking care of a telephone plant. During the past three and a half years he has had charge of the equipment, maintenance and construction work of the entire system of the New Long Distance Company.

W. S. POWELL has been promoted from the management of the business of the Wisconsin Telephone Company at Eau Claire, Wis., to that of the district having its headquarters at Stevens Point.

CHARLES SHIRK has recently been promoted to the management of the exchange of the Independent Telephone Company at Morrison, Ill.

With the Builders

PERRYVILLE, ARK.—Among the many improvements planned by the Choctaw Telephone Company is the installation of an exchange at Perryville and one at Perry. A number of new lines are also to be built, and the company's plant made strictly up to date in every particular.

COVINA, CAL.—A lot has been purchased by the Home Telephone Company, upon which it expects to erect a branch exchange to be operated in connection with the Covina exchange. A thoroughly up-to-date system is to be installed, representing an expenditure of something in the neighborhood of $12,000.

PASADENA, CAL.—It is stated that the city of Pasadena has decided that it would be more economical to consider the proposition of the Home Telephone Company for the establishment of an exclusive police service than to construct its own system, and it is probable that there will be little delay in the signing of the contract.

WHITTIER, CAL.—Many new lines are being erected in this city by the Home Telephone Company to take care of its increasing business.

MONUMENT, COLO.—A new telephone line in Monument is being constructed by Messrs. Roberts, Guire and others.

GRAND RIDGE, FLA.—Among the improvements planned by the Marianna Telephone Company is the installation of an exchange at Grand Ridge, which will give connections with Marianna, Cypress, Sneads and points over the river as far as Quincy.

NEZ PERCE, IDAHO.—A new exchange building is being erected in this city by the Nez Perce Co-operative Telephone Company, in which is to be installed its central office.

ALEDO, ILL.—The Aledo Telephone Exchange Company, which operates lines to Millersburg, Joy, Seaton, Hamlet, Viola, Preemption, Sherrard, Cable and other points, contemplates making a number of extensions to its system.

CLINTON, IA.—A ninety mile toll line from Clinton to Cedar Rapids has been erected by the Tri-City Telephone Company, and other extensions are being considered.

CRESTON, IA.—The Creston Mutual Telephone Company is making many improvements and extensions in its system. It is estimated that when these changes have been made the company will be able to give service to about two hundred additional subscribers.

KEOKUK, IA.—An entire new system is being installed by the Mississippi Valley Telephone Company in Keokuk, at which place a new exchange building is being erected.

FORT RILEY, KANS.—From present indications it is quite probable that the Post at Fort Riley is to be equipped with an up-to-date Government telephone system. Plans are being considered for the installation of telephones in each office building, all officers' quarters, each battery and troop barracks, headquarters, squadron and battalion stables, packers' camp and pumping station. It is rumored that this installation will take place before cold weather sets in.

GRAND RAPIDS, MICH.—Lines to Lawton and Cassopolis are being erected by the Citizens' Telephone Company, and its plant otherwise improved.

LANSING, MICH.—Construction work on its new building is soon to be commenced by the Citizens' Telephone Company. Its system is being entirely remodeled, and a much improved service is promised to the company's patrons.

BILLINGS, MO.—The business of the Cash Electric Telephone Company, of Norwood, has been removed to Clever, P. O. address Billings, and the name of the firm changed to the Clever Telephone & Supply Co. It is the company's intention to install and operate a telephone exchange at this city.

GRANT CITY, MO.—Among the improvements planned by the Farmers' & Merchants' Mutual Telephone Company is the installation of a new switchboard.

ALBANY, N. Y.—A telephone system between Albany and Fonda, the object of which is to facilitate train despatching, is being installed by the New York Central Railroad.

CASTILE, N. Y.—Many extensions to its plant are to be made by the Wyoming County Telephone Company.

LYONS, N. Y.—Many improvements are to be made by the Wayne County Telephone Company for the betterment of its service at this city.

WILMINGTON, N. C.—Among the extensions recently made by the Wilmington, Southport and Little River Telephone Company is a seventy mile line on which are installed exchanges at Shallotte, Supply, Calabash, Little River and Southport; and the company has in mind other improvements and extensions.

YOUNGSTOWN, O.—From this city comes the report that the Lake Erie, Alliance & Wheeling Railroad, which is a branch of the Lake Shore system, has under consideration the installation of a complete telephone system along its line.

CAMBRIDGE SPRINGS, PA.—The Cambridge Springs Electric Telephone and Telegraph Company, which has recently moved into its new exchange building, is erecting rural lines to McLallen Corners and to Rockdale township, and is also rebuilding its line to Brown Hill.

KEMPTON, PA.—A telephone line from Kempton to New Tripoli is being erected by the Rural Telephone Company.

REITZ, PA.—The Central Telephone Company, which already operates in Forward, Reith, Central City, Buckstown, Shanksville and other places, contemplates the erection of additional lines to Hillsborough, Windber, Stoyestown and a number of other places.

BEAUMONT, TEXAS.—A new telephone line paralleling its eight inch pipe line has been erected by the Gulf Pipe Line Corporation.

SWANTON, VT.—To accommodate its rapidly increasing business a line from Swanton to East Swanton is to be erected by the Northern Telephone Company.

LANGLEY, WASH.—Lines in Langley and throughout Island county are under construction by the Whidby Telephone Company.

ATHENS, WIS.—The Independent Telephone Company, which has expended about six thousand dollars in improvements this year, is planning the construction of a western line to connect with the Dorchester line, which will give Athens direct connection with Abbottsford, Medford and other places.

CARYVILLE, WIS.—New lines in this city are being built by the telephone company owned by Messrs. Wagner & Whittaker.

FENNIMORE, WIS.—The lines of the Mutual Telephone Company of this city are being rebuilt.

RICE LAKE, WIS.—The Rice Lake & Northeastern Telephone Company expects to construct a line from Rice Lake to Draper, Wis.

STOUGHTON, WIS.—The Kegonsa Telephone Company has installed an entirely new system at this city, and connections are to be established with Madison.

WAUPACA, WIS.—The lines of the Farmers' Telephone Company are to be extended from Waupaca to Baldwins Mills.

BRANDON, MAN., CAN.—An official of the Manitoba government's telephone department states that work will be started this fall on the government telephone system to be built at Brandon. Address Orrin F. French, superintendent of telephone construction for the province, Winnipeg, Manitoba.

BRANDON, MAN., CAN.—A petition is being circulated in the municipality with the object of inducing the council to construct its own telephone lines, and when completed to connect them with the Government lines that are to be erected.

SALTILLO, MEXICO.—The Woessner Telephone Company, which is soon to be connected with the Durango Telephone Company, will also extend to Torreon, Zacatecas, Monterey, Matamoras and other places.

UNDERGROUND.

SAN BERNARDINO, CAL.—It is estimated that between $65,000 and $75,000 will be required by the Home Telephone Company to complete its conduit work in this city.

COLUMBUS, O.—Considerable underground work is being done by the Central Union Telephone Company in this city.

WASHINGTON, PA.—The State Mutual Telephone Company, which has an underground system installed at Waynesburg, is doing considerable conduit work in this city.

TORONTO, ONT., CAN.—Application has been made by the Bell Telephone Company to place additional wires underground in this city.

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The American Telephone Journal

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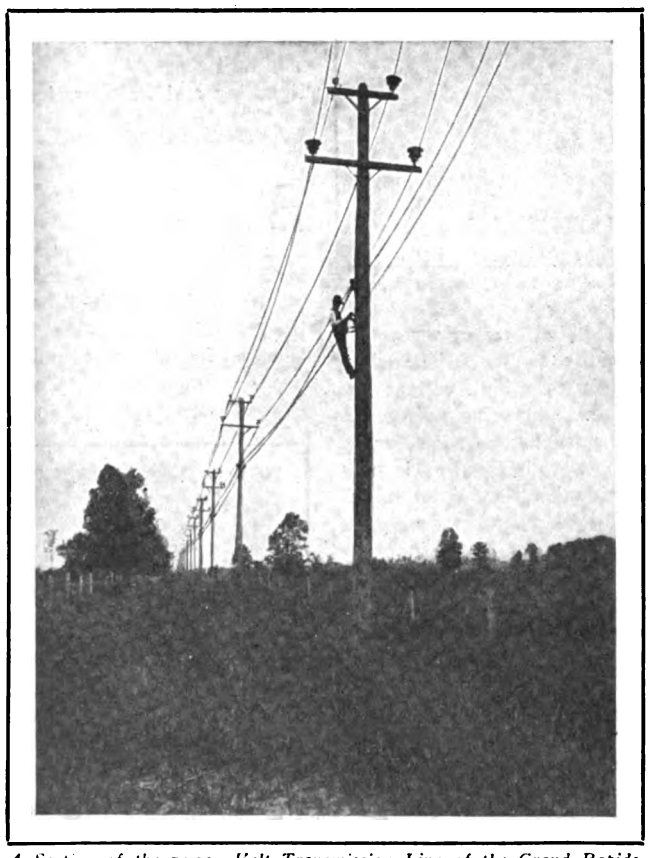
VOLUME XVI. SATURDAY, OCTOBER 12, 1907. NUMBER 15.

Successful Operation of a Telephone Line on 72,000 Volt Transmission Poles

By R. D. Lillie.

THE operation of a telephone line carried on the poles which form the main transmission line of the Grand Rapids-Muskegon Power Company seems to show that, under proper conditions, telephone wires may be carried for miles within a short distance of a high tension current without interfering with their usefulness for transmitting speech. The need of telephonic communication along its rights of way, and between its employees in stations is felt by the Grand Rapids-Muskegon Company to an unusual degree. It has recently completed a wonderful system for supplying electrical power to western Michigan, deriving the energy from the water power of the Muskegon River. As it covers a wide field, the various portions of its plant being separated by considerable distances, the power houses, for example, being some forty miles from the general offices, the telephone affords the only feasible method of communication, and for many reasons it seemed advisable to the officers to install a system of their own. At present the telephone line is working only along a single power transmission line, which has just been completed, other lines shown on the map being under construction or projected. This line extends from Rogers Dam, near Big Rapids, and the Croton Dam, near Newaygo, about twenty miles south, to Muskegon, Grand Haven, Grand Rapids, Holland and Zeeland. This transmission line is supported on wooden poles which also carry the telephone wires. There is another line now in the course of construction, which will extend direct from the dams to Grand Rapids. Steel towers will be used to support both the power wires and the telephone wires on this new line; but, as the success of the telephone line has not yet been proved, it will be useless to describe the plans for its erection.



A Section of the 72,000 Volt Transmission Line of the Grand Rapids-Muskegon Power Co. Lineman Working on Telephone Wires Carried on Brackets.

Although telephones on the private system are to be later on installed at the different points at Muskegon, at the present time the instruments are only used at the two large power stations and sub-stations for communication in respect to the operation of the system. The reason why the telephone has not been installed in the general offices up to the present time is that the officials fear that with the high power wires in such close proximity to the telephone wires a storm might arise and cause an accident which would tend to bring a high tension current into the office at night when no one is at hand to watch it. So the best thing to do is to avoid such a possibility by keeping the telephone wires away from the building. Communication may be had along the line by the officers, if necessary, from a sub-station located not quite two miles from the office. This leaves for the actual number of instruments installed one at each of the main power stations at Rogers Dam and Croton Dam, with other telephones located at transforming stations at Muskegon, Walker, Grand Rapids, Zeeland and Holland, all of which are shown on the map of the company's system, which appears on the following page. The voltage of the wires carrying the current at high tension for transmission of electrical power is 72,000 along the line carrying the telephone wires. This voltage is maintained throughout the entire main line. When the Croton plant is started the new line will carry 100,000 volts. The telephone line is placed on ordinary brackets, the upper one of which is set about eight feet from the lower cross arm carrying the high voltage wires. The brackets carry D. P. D. G. glass insulators, to which the No. 10 N. B. S. copper wires are tied in the ordinary manner. As far as taking any special precautions against accidents are concerned, it is interesting to note that no special guarding devices have been installed at any point in the line. Conditions are so uniform throughout the entire line that these have been considered unnecessary, reliance being placed upon the efficiency of the supports for holding the high tension wires. Provided that no break ever occurs in the high tension wires there is

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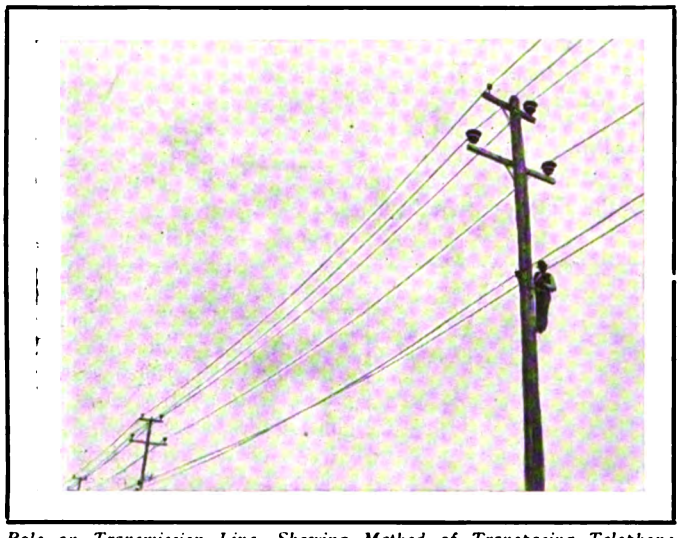
little liability of an accident which will cause them to be crossed with the telephone lines, as the latter are kept at a uniform distance below the high tension wires at all places. The liability to serious injury from accidental contact is, of course, present, but is reduced to the minimum, not only by the extreme care employed in the construction of the line, but by the fact that a device has been installed at the power stations by means of which the current is automatically turned off from the high tension line the instant after a wire is broken. Of course, for a brief instant, if the high tension wires should come in contact with the telephone line, a discharge would pass through the latter, and it would no doubt be dangerous to any person working upon it, or possibly even to some one using the telephone, in spite of the protective devices which have been installed near each instrument.

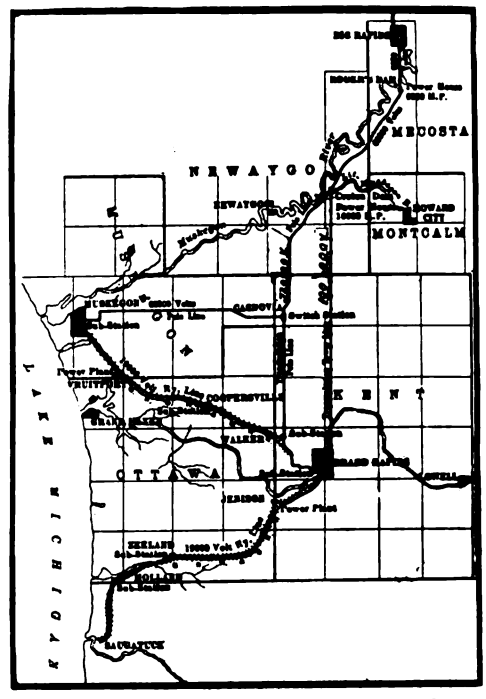
On this telephone line no lightning arresters are installed, as the bringing of the ground connection so close to the high tension line, or to wires subject to its influence, would be likely to produce undesirable reactions. Long half ampere fuses set in ordinary fuse boxes are installed, and these are believed to furnish all the protection which will be required.



Pole on Transmission Line, Showing Method of Transposing Telephone Wires.

It was naturally to be expected that special precautions would have to be taken to prevent induction troubles. The close proximity to wires carrying current at such a high voltage has made it necessary to pay great attention to securing uniformity of construction of the telephone line, particularly in so far as separation of the telephone lines from the power wires is concerned. The distance of the respective brackets upon which the telephone line is mounted is maintained uniform throughout the entire length of the line. Transpositions are cut in every fifth pole, there being forty poles to the mile, this distance being thus divided into eight transposition sections. The accompanying photographs show respectively the method of mounting the brackets opposite each other at the transposition poles, and the regular plan of mounting the two brackets in the same vertical line on one side of the pole. A convenient arrangement for making the transpositions with a minimum liability of crossing the wires is provided by the simple device of mounting the brackets opposite each other at every fifth pole. During good clear weather, when there is a small percentage of humidity in the air, the noise produced in the telephone receiver is very slight, being much too low to bring about any effect which offers a serious hinderance to the carrying on of conversations in an ordinary tone. In wet weather the noise, as would naturally be expected, is considerably increased; but even then it has been the company's experience that it is not so bad as to prevent conversations.

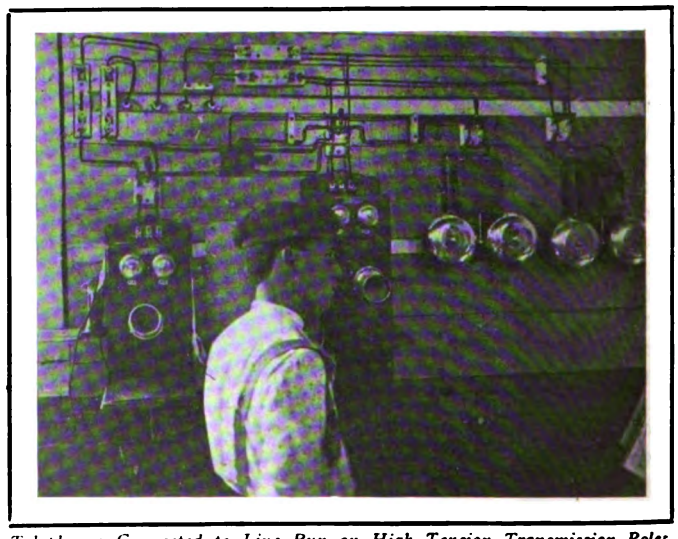
The question was asked the officials of the company whether or not it had been their experience that any circumstances might arise in the operation of the power plant which would increase the amount of noise on the telephone line to such an extent as to prevent conversation, when the telephone line itself was in good condition. The object of this inquiry was, of course, to ascertain whether it would be possible for an accident to the power line, other than a breakdown or cross with the telephone wires, to put the telephone line out of business, thus making it correspondingly difficult to make repairs to the power line. The officials state that they have not discovered any case of this kind, and that the use of the telephone, as far as they are concerned, has proved its reliability as an aid to the operation of a high tension power plant. The reliability of the line is indicated by the fact that up to the present time the only accidents which have happened to it have been due to its being struck by lightning and its operation at other times was uninterrupted.



Map of Present and Proposed High Tension System.

FAVORS TO POLITICIANS GET BELL COMPANY INTO TROUBLE IN BOSTON.

BECAUSE it gave employment to various men at the solicitation of certain aldermen, senators and members of the house of representatives of Massachusetts, the New England (Bell) Telephone and Telegraph Company has been indicted by the grand jury in Boston. Not only has the telepohne company been indicted, but inquiry is also to be made into the actions of a number of politicians who recommended their favorites for employment. The situation is being watched with the keenest interest in the local field, as it is believed to have an important bearing upon the cost of service, which is the subject of an investigation brought on by subscribers who believe the rates in the metropolitan district are much higher than they should be.



Telephones Connected to Line Run on High Tension Transmission Poles, and Located in a Transformer Station.

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The Maintenance of Toll Lines and Operation of Composite Circuits*

By N. C. Kissell.

TROUBLE on toll lines can be located by means of a Wheatstone bridge and galvanometer. It is necessary for a man handling toll lines to have a clear understanding of a bridge, in order to intelligently locate troubles. Fig. 7 shows the circuit of a bridge. It consists of three sets of adjustable resistances called the *A* or ratio arm, the *B* or ratio arm and the rheostat arm. A galvanometer is connected across the *A* and *B* arms as shown. The arm *X* is the unknown resistance to be measured. The principle of the Wheatstone bridge is as follows: The current from battery has two circuits to divide between, one through *A* and *X*, the other through *B* and *R*. Suppose each one of the four resistances to be 100 ohms and the potential of the battery 20 volts, then the strength of the current in each branch of the divided circuit will be 20 ÷ 200 = .1 ampere. There will then be no difference of potential across points 1 and 2, because the drop of potential in *A* will be 100 times .1 ampere = 10 volts, and the drop of potential in *B* will be 100 times .1 ampere = 10 volts. As the current is flowing in the same direction in both circuits, and points 1 and 2 are at the same potential, no current can flow through the galvanometer. Now suppose *A* and *X* each to be 50 ohms, and *B* and *R* 100 each. Then there will be 20 ÷ 100 = .2 ampere flowing through *A-X*, and 20 ÷ 200 = .1 ampere flowing in *B-R*. The drop of potential in *A* will be 50 times .2 ampere = 10 volts, and the drop in *B* will be 100 times .1 ampere = 10 volts, and consequently there is no difference of potential across the galvanometer. From this, then, it follows that the four arms do not have to be of equal resistance, but the currents flowing through the *A* and *B* arm must be in such relation to their resistances that the drop in potential through *A* is exactly equal to the drop of potential in *B*. The arms *A*, *B* and *R* being known, and arm *X* unknown, we have three sides of a proportion to find the fourth, or $R : A :: B : X$, which is equivalent to the statement $\frac{A}{B} \times R = X$. For example: If *A* is set at 100 ohms, *B* at 10 ohms, and *R* moved until a balance is obtained, which is found when *R* is 100, then 100 ÷ 10 × *R* = 1000, which is the resistance of the unknown arm. To prove, in this case the resistance of *A-X* is 1100 ohms, and *B-R* 110 ohms, and if the potential of the battery is 11 volts, there will be 11 ÷ 1100 = .01 ampere of current flowing through *A-X* and 11 ÷ 110 = .1 ampere flowing through *B-R;* therefore the drop of potential through *A* is 100 times .01 ampere = 1 volt, and through *B* will be 10 times .1 ampere = 1 volt, consequently there is no difference of potential across the galvanometer and no current flows through it. In finding a balance, the needle of the galvanometer will swing from side to side, one way for too great a resistance, and the other way for too low. This depends upon which of points 1 or 2 is at the higher potential, as the magnetic field of the galvanometer is fixed and stays in one direction, the current passing first in one direction and then the other through the coil, causing it to reverse its motion. This is the principle of the Wheatstone bridge, using words and arithmetic to illustrate it instead of algebraic formulæ.

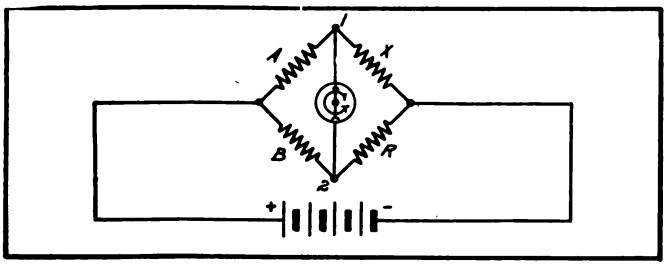

Fig. 7. Wheatstone Bridge circuit closed through battery to illustrate operative principles.

The principal troubles which occur on toll lines are: the line wires becoming crossed together, becoming crossed with another circuit, grounds on one or both wires, high resistance crosses through which conversation can be carried on but through which it is impossible to ring, and unbalancing of the line caused by loose connections or bad joints, and one side of the line becoming open. In the simplex circuit, if the line wires become crossed, or one side comes open, it will not affect the "Morse," but in the composite it will. If a line is crossed out it can be located by placing the line in the *X* arm of the bridge and measuring, then by deducting the cable resistance and knowing the size and resistance of the line wire per mile, the distance to the trouble can be computed. This is true provided the cross is a dead short circuit. This can be proved by trying to talk or ring through it, and if one cannot do either, this test would be pretty safe. A better way would be to locate it by means of a "Varley loop" or by a "Murray loop" test. As the Varley will usually answer all purposes, it alone will be considered here. High resistance crosses and grounds can also be located by means of the Varley loop test providing there is one good wire to work with. The Varley loop is generally explained by an algebraic formula, which is perfectly true, but the writer believes a clear idea of its action can be conveyed without any formula, and such an explanation will undoubtedly be interesting and useful to many telephone men. The two tests made by this method are shown in Fig. 8.

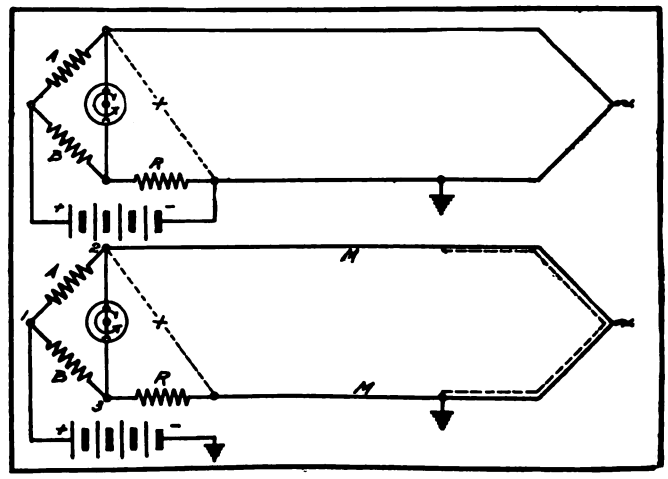

Fig. 8. Method of making connections for loop measurement and locating the ground by the Varley method.

In the upper diagram are shown two line wires, one having a ground on it which can be located by means of a Varley loop test. The line is first opened at the distant end to find out which one is the bad wire. This is connected to the rheostat side of the *X* arm, and the good wire connected to the ratio side of the *X* arm. The distant ends are then connected together and this whole loop is measured. If, for example, the line is one hundred miles long and is a No. 12 N. B. S. copper wire having a resistance of 5 ohms to the mile, the loop then being measured as shown in the diagram will be found to have a resistance of 1000 ohms, or 500 ohms in each wire. Now the proper thing to do is to disconnect the battery from the rheostat arm and connect it to ground as shown in the lower

*Continued from the issue of October 5.

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diagram. This provides a divided circuit for the current from the battery. Current will divide at point 1, part going through ratio arm *A*, wire *M*, and wire *N* to ground, returning to battery; the other part will pass through ratio arm *B* and wire *N* to ground and back to battery. If the ratio arms are equal, say 100 ohms each, it is evident that the resistance from point 2 to the ground will be greater than the resistance from point 3 to ground, and by means of the rheostat arm it will be necessary to insert a resistance of the same value as the difference in resistance between points 2 and the ground and point 3 and the

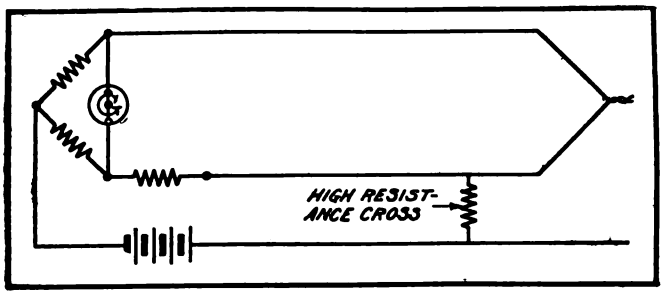

Fig. 9. Connections for application of Varley test to the location of a high resistance cross between one side of a telephone line and a third wire.

ground. When this is done the needle will show a balance, or in other words, the resistance from 1 to the trouble will be the same as from 3 to the trouble, and the drop of potential through *A* and *B* will be the same. As the two line wires run parallel, the resistance of one wire to the ground will be the same as the resistance of the other wire to this point, therefore the amount of resistance plugged in by the *R* arm is exactly the same as the resistance from the dotted line around wires *M* and *N* to ground, and compensates for this resistance. Supposing the first measurement of the whole loop is 1000 ohms, and in the second measurement by grounding the battery 400 ohms has been plugged into the *R* arm to obtain a balance. As this 400 ohms is the amount necessary to compensate for the resistance of the loop from the dotted line around to ground, and as this resistance is part of the whole loop, then the remainder of the loop is 1000 — 400 = 600 ohms, which is the distance from the bridge to the fault on both wires. This quantity divided by 2 gives the distance on one wire. As the wire measures 5 ohms to the mile, the two wires loop resistance will be 10 ohms per mile, therefore 1000 ohms, the first result, less 400 ohms, the second result, leaves 600 ohms representing the distance from the bridge to the trouble on both wires. This resistance divided by 10, the resistance per metallic mile, equals 60 miles. As 400 ohms is the resistance of the loop from the dotted line to the ground, the trouble is located by dividing 400 ohms by the loop resistance of the wire (10 ohms), which shows it to be 40 miles from the distant end. The whole line is 100 miles long, and the trouble is 600 divided by 10 = 60 miles from one end, and 400 divided by 10 = 40 miles from the other end. From this consideration it may be seen that if one side of a circuit is grounded, by crossing out the distant end and grounding the battery, the resistance inserted by the *R* arm, divided by the loop resistance per mile of the wire, gives the distance of the fault from the distant end. This is true providing the resistances of the *A* and *B* arms are equal, as they should be for toll line work, using ratios of 100 ohms. This will not enable one to obtain a balance in fractions of an ohm, but only in ohms. This is close enough, since it is very difficult to get the needle to stand at dead beat when measuring on a long line, because the resistance varies a fraction owing to the effect of trees which may be in the line, etc. By using an even ratio there is only a chance of missing the resistance to the trouble by 1 ohm loop resistance, which on a No. 12 N. B. S. wire would amount to about 4 poles, an error which is not to be considered as serious. Also, by using an even ratio a simpler calculation can be made. If the ratios are unequal the distance to the trouble is calculated by the formula

$$\frac{BL - AR}{B + A} = X,$$

where *L* equals the resistance of the whole loop. This is to be divided by the resistance of one wire to give the resistance to the trouble.

The Varley loop test can be used to locate a high resistance cross. It is well to understand that any resistance in the ground or any varying resistance will not affect a measurement by means of the loop test, because the ground or return for the current is common to both divided circuits and the currents in the latter will vary in unison. Fig. 9 shows a method of locating a high resistance cross by using a third wire of the same gauge as the wires in trouble. The third wire is made to form a loop with one of the pair in trouble, the other side of the pair being connected to battery as shown. One forms in this manner a divided circuit and the trouble can be located as indicated in the illustration. The Varley test is a sure method of locating a cross between wires of different gauge, say for instance a pair of No. 12 wires crossed with a No. 8. In this case both wires of the pair of No. 12's are connected to the *X* arm of the bridge, and the distant ends crossed together. The No. 8 wire with which it is crossed is then grounded. This gives all the conditions to make a Varley test on the No. 12 wires, and the result is independent of any resistance in the cross. It will be seen that any trouble which is caused by the wires among themselves can be located by means of the Varley test by making different combinations with the circuits which can be left to the test board man's versatility, the idea remaining the same, that of obtaining a divided circuit through the bridge.

The Varley loop test is found to be almost the one great panacea to cure all toll line ills. If a wire is crossed with a foreign wire which has battery on it the latter can be located provided the foreign battery is grounded. If it is of higher potential than the bridge battery, the current will flow over the divided circuit from the point of trouble, instead of from the arms of the bridge; or the bridge battery can be cut out and the center of the *A* and *B* arms simply grounded to offer a path for this foreign current. Referring to Fig. 8, it makes no difference whether current flows from point 1 over the wires to ground, or from ground over the wires back to ground. When a balance is obtained in the latter case, the drop in potential is the same through wires *N* and *M* as it is through wire *N* and the rheostat arm, and there will be no difference of potential between points 2 and 3.

A wire may be crossed with a foreign line over which the wire chief has no control and the latter line may be perfectly clear of ground or battery. Here is a case where there is nothing to work on with a bridge, and this trouble can be located by means

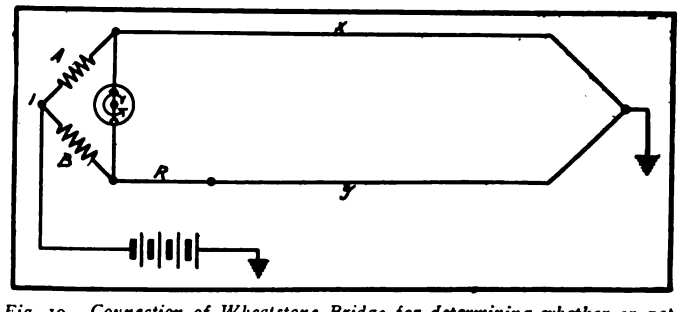

Fig. 10. Connection of Wheatstone Bridge for determining whether or not the two sides of a telephone line are balanced.

of a listening test which will be explained later. When a wire is open there is no absolute test to locate the trouble, but it can be run into a given section by testing with test stations. If it is on a route where there is no test station for a hundred miles, a very good approximate test can be made with a voltmeter in clear weather providing the wire that is open is clear of ground and also open a good distance from the testing end. A wire that is open at a comparatively short distance from the wire chief who is testing would be termed "open near," and one quite far out "open distant." If a line is in good condition grounded battery sent to line through a voltmeter will give very little deflection. A greater deflection can be obtained, say, by using a 35 volt voltmeter and a battery potential of 110 volts. Assume that the voltmeter has 80 divisions on the scale. The

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distant end of the wires, one of which is open, is opened and insulated at the distant end. Then, upon placing the voltmeter in on the good wire, a deflection of 55 divisions is found, to take a definite example, and on the wire that is open the needle moves over 11 divisions, or one-fifth of the first deflection. This shows that one-fifth the wire on one circuit is one-fifth as long as that on the other side of the line. Say the length of the good wire is one hundred miles. One-fifth of this would be twenty miles, and a lineman can be sent to this point to work from. This is not absolutely true, but in lots of instances it will be found to be a practical test which will be very successful.

One of the most important considerations in a telephone line used for telegraph purposes is that the line shall be balanced, or in other words that the resistance of both line wires from terminal to terminal shall be equal, or nearly so. To determine whether a line is balanced or not, the two terminals of the wires are grounded, at one end, and the other ends placed in the unknown side of a Wheatstone bridge. The rheostat arm is plugged out and the ratio arms are given the same value. This is shown in Fig 9, with one side of the battery grounded. Then if the line wires x and y are both of equal resistance, the current will divide equally from point 1, through A arm, wire x to ground, and through B arm, wire y to ground. Consequently the drop in potential through A and B will be the same and, as the current is flowing in the same direction in both arms, there will be no difference of potential across the galvanometer and therefore no deflection, indicating that the line is perfectly balanced. If wire x had a resistance of 500 ohms, and wire y 400 ohms, there would be a deflection of the needle, and the rheostat arm would have to be plugged in until the needle would indicate a balance. As the resistance of the A and B arms is equal, the amount plugged in by the rheostat arm is the resistance needed to compensate for the difference in resistance of the wires. In the figure, x being 500 ohms and y 400, the resistance plugged in to balance will be 100 ohms.

An unbalanced line will not interfere with the "Morse," but will make the telephone circuit noisy and the "Morse" impulses will be heard on account of the unequal division of current through the repeating coils. The main causes for an unbalance found in practice are loose connections, which can be in the exchange, or on the line, occurring, for instance, in a loose test clamp, a bad joint, or a transposed cable pair. A loose joint or test clamp which introduces resistance in one side of the line can be located by means of a bridge even though the resistance is constantly varying. By locating a bad joint is not meant locating it in terms of a number of miles from the office, but determining whether the trouble is in a certain joint which may be in the middle of a span. The method is shown in Fig. 11. Here is a bad joint in wire x which introduces a resistance of, say, 100 ohms. This of course makes the line very noisy, and tests are made at the different testing points on the line to determine in what section the line is unbalanced, and the lineman in that section is called out on the trouble. It will be seen by the figure that a short circuit placed across the wires at any point between the joint and the ends which are grounded will not affect the bridge after it is balanced to compensate for the extra resistance introduced by the joint. Upon placing a short circuit across the wires between the bridge and the joint the balance will be destroyed, and by plugging out the resistance in

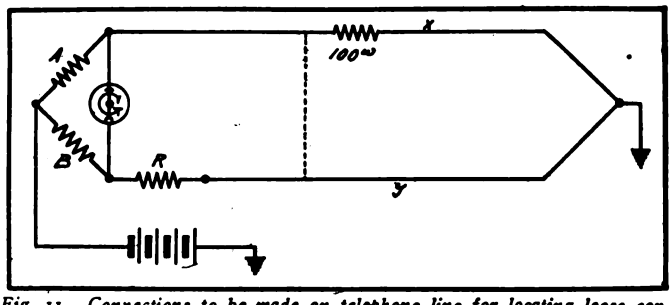

Fig. 11. Connections to be made on telephone line for locating loose connection with Wheatstone Bridge.

the rheostat arm the line will show a balance, because the current will divide equally over x and y to the short circuit and from this point pass to ground back to battery.

In the figure, if a short circuit were placed across the telephone line as shown by the dotted line, the part of the circuit between this short and the distant end would act merely as a return for the current back to battery. No matter how much the defective joint varied its resistance, the changes in current in wires x and y between the bridge and the short circuit would be the same at the same instant, and therefore there would be no difference of potential across the galvanometer. The lineman upon seeing anything suspicious or of a nature indicating its liability to cause an unbalance, can cross the circuit out ahead and behind the doubtful part, and it can then be determined whether it is the trouble or not. This test never fails and is the only way to locate an unbalance, as the latter is usually something not seen with the eye, like a short circuit, ground or a cross.

(To be Concluded.)

Features of Work in a Well Systematized Cable Department

By O. R. Barnes.

In this article reference is made to the department which has to do with the pulling in and splicing up of underground cables, the aim being to deal principally with the handling of the work, routine matter, etc., and indicate a basis upon which the ever alert and thinking telephone man can build a system of his own. Especial attention is given to considerations affecting the maintenance of an underground plant.

Before a section of cable can be ordered from the manufacturers it is necessary to know exactly the length required, and for this purpose a map should be kept of the town or city. Upon this map it is desirable to clearly show the conduit runs on the various streets with the exact dimensions between manholes, and the amount of cable to be added in each manhole for proper racking. It is considered good practice to employ only competent men in getting these measurements for the map, as a cable ordered too short is liable to make it necessary to pull a splice in between manholes, or else go to the trouble and expense of ordering a new length of cable.

As the cable is ordered numbers should be assigned each reel, and the manufacturer is expected to have this number lettered in large figures on the reel when it is shipped, along with information concerning its destination. Having reels numbered consecutively in this manner enables the foreman to readily pick out the desired reel from a number of others without running a chance of getting the wrong length of cable, and it also is a great help to the storekeeper in keeping track of a consignment of cable. This is especially true when a reel of cable is used for odd jobs and hauled around from place to place in a city. All the men have to do in such an event is to report so many feet used on such and such a job from reel number so and so. In this manner the reel is charged to the cable department by the storekeeper until

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it is used up, and then all he has got to keep his eye on is the reel itself, which he sends back to the manufacturers in due course of time after its return by the cable department.

Lists should be made and a number of copies typewritten, when considerable cable is to be pulled in. Each list should show the reel numbers and the points at which the reels are to be used, in the natural order of completion of work. The foreman should keep a copy of this list on his desk, and

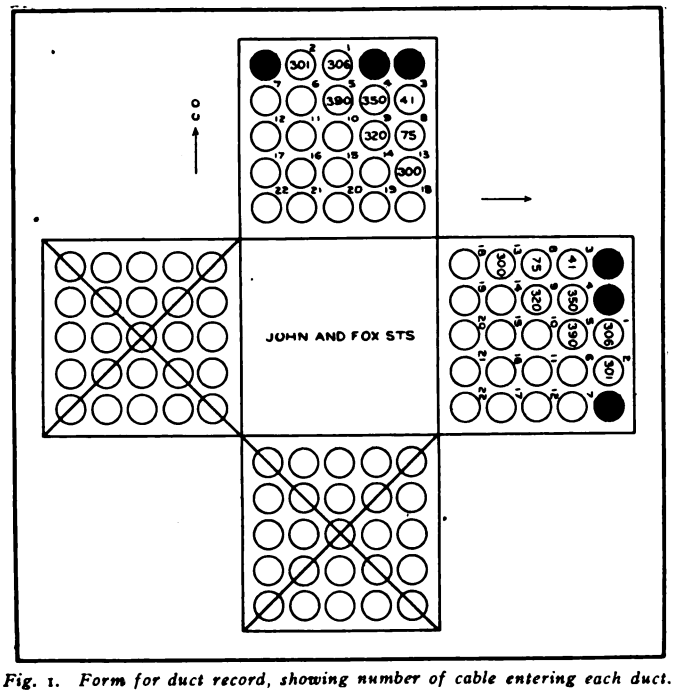

Fig. 1. Form for duct record, showing number of cable entering each duct.

as the cable pulling gang reports the cable pulled in, check it off and make provisions to have it spliced up. If the cable is going to be pulled in in a congested subway the number of the duct in which each cable is to be run should be included in the list.

A duct record is something that every well organized department should possess. Some companies consider this record a valuable asset as it makes it unnecessary to send a man out to select a duct every time a new cable is to be pulled in. Companies which rent ducts to other parties find it extremely convenient to be able to say when called upon "use duct number so and so." This record can be kept on cards printed as shown in the illustration, and the cable number written in the circle representing the duct. The formation of the subway entering a manhole sometimes varies, and this can be taken care of by blackening in the circles to make the wall resemble the actual formation. Ducts are always numbered from left to right looking away from the exchange, and arrows are drawn in on the sketch looking toward and away from the exchange so as to show the cables entering and leaving the manhole. Where the subway enters a manhole from only two directions, the other two walls are crossed out on the sketch. Some companies number the ducts from the nearest curb line—thus, "top two, second curb," means the duct in the second tier from the top and the second away from the curb. This scheme of using two ordinates in locating a duct is more or less confusing, and can not always be clearly understood where the duct formations are irregular.

A good scheme to follow when numbering cable in a multi-exchange district is to assign a certain series of numbers to each exchange and a separate series for the trunk cables—for instance, if there are five exchange districts, viz., Main, North, East, West and Central—let all of the subscribers' cables in Main number from 101 to 200; North from 201 to 300, and so on, assigning numbers 1 to 100 to the trunk cables. Thus, a man working in a manhole can detect at once from the numbering a trunk cable from a subscriber's cable, and as the trunk cables are the important ones he will exercise care not to handle them roughly. Cables should always be tagged in a conspicuous place in every hanhole, preferably on the sleeve of the splice, showing their respective numbers; and if two cables bearing the same number pass through the same manhole, the pairs in each should be stamped on the tags. When cable changes are made, changing the number of a cable, all of the tags on that particular cable should be promptly changed upon completion of the work.

Periodic inspection of manholes is another function that should not be overlooked on the ordinary maintenance of underground cables. On these inspections every cable should be carefully looked over with a view to discovering any pin holes or cracks in the joints, and the manhole thoroughly cleaned up. The man in charge of making this inspection should be required to make a report on every manhole visited, stating the condition in which he found the manhole and calling attention to any repairs needed to put the cables in proper condition. Printed forms should be provided to take care of this work.

When complicated cable throws have to be made it is absolutely essential that each and every man employed on the job shall clearly understand every move in connection with the work in order that he may perform his own part correctly and economically. It makes it extremely hard for the foreman when he has to instruct each man orally as to his specific part on the job. Should the foreman go to the trouble of instructing his men in writing he will still experience difficulty in conveying to them the small details necessary to avoid making mistakes through misinterpretation of statements, and when he undertakes to have his instructions typewritten and distributed to each of the men he again commits himself, and should his men make a blunder they can blame him to an extent for not warning them on various points relating to the work. Before the work described in his typewritten statement is completed the foreman is liable to realize that the time he spent dictating to a stenographer was simply wasted.

The best way, and without doubt the safest, to avoid blunders is to drill the men to follow a good system. By a good system is meant a simple routine manner of conveying instructions so that they can be readily comprehended by all concerned without being especially initiated—one which will impress upon the men a sense of responsibility and cause them to go about their work in a systematic manner. The man who has such a system back of him grinds out results

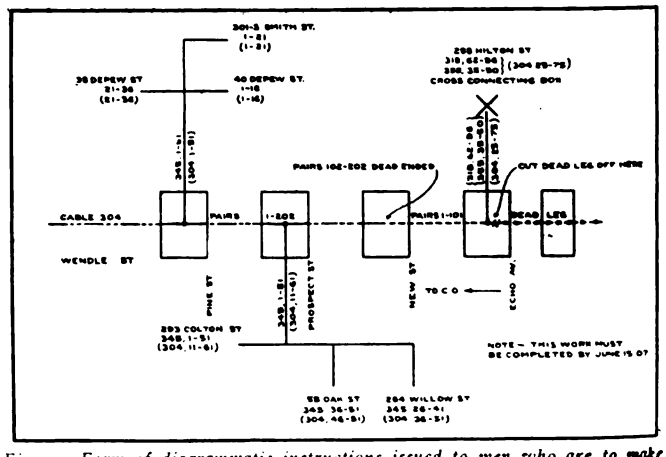

Fig. 2. Form of diagrammatic instructions issued to men who are to make cable throws.

and inspires with his own individuality every man under him, and every piece of work bears his stamp. To perfect such a system it is first necessary to find the weak points and then set diligently to work to strengthen them, but to strengthen the system it is sometimes necessary to adopt methods devised and perfected by other men; hence much benefit is de-

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rived from looking around and learning something about the affairs of other companies.

Of course, a cable department could probably be run by instructing the men orally—for instance, one could say to Jack Cable Splicer, "You go to the manhole corner of Jones and Smith streets and throw the cable to 288 Jones from cable No. 318 pairs to 62 to 96, cable No. 355 pairs to 35 to 50 onto cable No. 304 pairs 25 to 75, and when you get through there go to the manhole corner Jones and Spruce streets, etc." But it is safe to say that this is not a systematic way of handling the work. Therefore a more explicit manner of telling Jack what one wants him to do should be adopted. By employing a good set of standard symbols one may draw a diagram of the work and teach him to read it. In fact, it is not a bad plan to use diagrams on all work something like that shown in the illustration Fig. 2. These diagrams can be made with an ordinary copying pencil and several copies run off on some sort of a duplicating machine. The splicer can have a couple of copies, a copy can be sent to the wire chief, to assist him when making the half-taps at the main distributing frame; a copy can be filed under the cable number for future reference, and another copy can be kept on the foreman's desk to enable him to follow the work up until it is completed. In this manner every person concerned in the work is furnished with a diagram and all are put in close touch with the job, so that the wire chief knows what to expect of the splicer, the splicer of the wire chief and the foreman of them all.

It will be noticed that on these diagrams the new distribution is always shown in parentheses and the connecting splices by dots. The manholes are shown by rectangles. According to the symbols used No. 304 cable is 202 pairs to the manhole at Hilton and New streets and from there on 101 pairs. In the manhole at Hilton and Echo streets the men cut off the 101 pair dead leg, which is going to be pulled out, and throw the 51 pair cable to No. 288 Hilton street from cable No. 318 pairs 62 to 96, and cable No. 355 pairs 35 to 50 onto cable No. 304 pairs 25 to 75, pair 62 of No. 318 becoming 25 of No. 304. In the manhole at Prospect street the 51 pair block cable is thrown from cable No. 345, pairs 1 to 51 onto cable No. 304 pairs 11 to 61, pair 1 becoming 11.

A standard set of symbols is shown in Fig. 3. These symbols answer all of the requirements for working sketches in blue prints, but they are not intended for the office cable layout. The cable layout which is kept in the office for engineering purposes should be of a fairly good size, showing

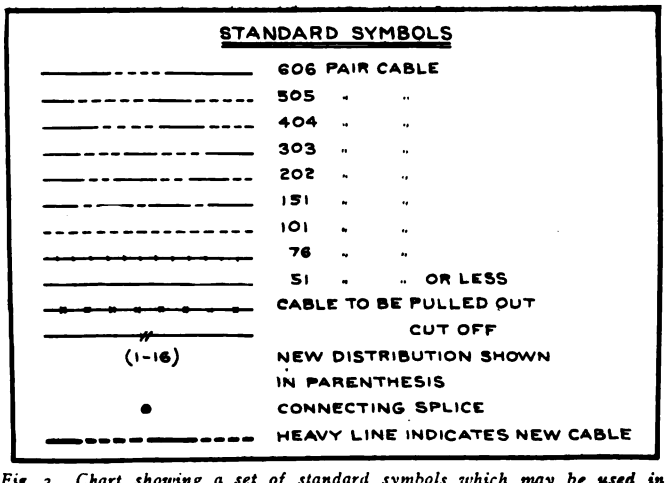

Fig. 3. Chart showing a set of standard symbols which may be used in drawing in cables between manholes to indicate size as well as location.

the relative locations of all manholes and a general color scheme followed in designating the different size cables. The colors most often used for these maps are as follows:

600 or 606 pair cable, red and green dashes.
500 or 505 pair cable, orange and green dashes.
400 or 404 pair cable, red and blue dashes.
300 or 303 pair cable, green dashes.
200 or 202 pair cable, orange and red dashes.
100 or 101 pair cable, blue dashes.
75 pair cable, orange dashes.
51 pair cable or less, red dashes.

By working out plans along the lines indicated much time can be saved and all manner of confusion avoided. The persons in charge of the work can issue instructions in a minimum amount of time, and be sure that work will be carried on according to their plans, thus aiding the men to work at maximum efficiency with a minimum of supervision.

A LOW-PRICED HOWLER CIRCUIT.

By E. S. Moorer.

THE manager of almost any telephone exchange can obtain at a small cost an ordinary "medical" induction coil. If it is to be bought new a dealer will sell it for about $1.25, and in nearly every town it is very easy to find one which has outlived its usefulness for its original purpose and so can be bought for a few cents and fixed up.

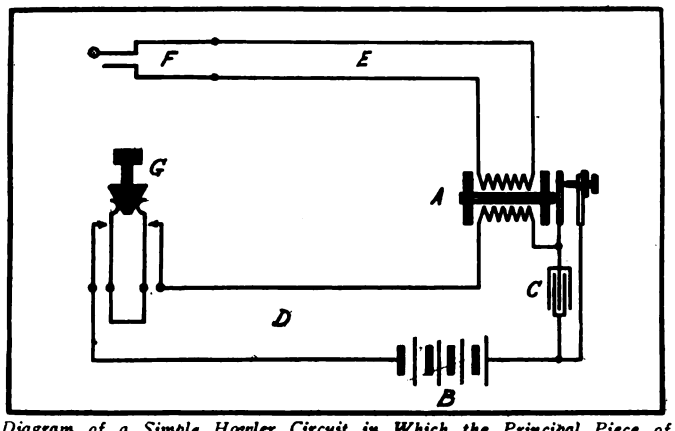

Diagram of a Simple Howler Circuit in Which the Principal Piece of Apparatus is a "Medical" Induction Coil.

The writer a few years ago used one of these coils as a vibrator in a howler circuit made for a small telephone company, and it worked so well and was made so economically that he thinks the idea is worth passing along. It was found that in order to make the medical coil give a sufficiently shrill and loud tone, it was necessary to make the vibrator operate more rapidly than its normal rate. This was arranged by removing from its end the iron ball which was placed as a weight on the armature. In its place was attached a small piece of very thin sheet iron, and the contact screw was moved over toward the free end of the vibrator in order to give a larger open space when the contact was broken. In the accompanying diagram, the induction coil is shown at *A* and the condenser, which may have a capacity of ¼ to 2 m. f., is cut across the vibrator contacts. *D* is the primary circuit, including the circuit-closing key *G* of any convenient type and the battery *B*, which should consist of six to eight dry cells. When the key *G* is closed the vibrator is set in motion and causes an alternating current of high frequency to flow out along the secondary circuit *E*. If plug *F* is inserted in a line jack and the key operated, the alternating current will cause the diaphragm of any receiver which is off the hook anywhere along the line to vibrate so rapidly as to set up a very shrill tone. If the receiver is not promptly replaced it will be for the reason that there is nobody in or near the building.

CUMBERLAND COMPANY ORDERED TO LEAVE BOONVILLE, IND., WITHIN THIRTY DAYS.

BECAUSE the Cumberland Telephone & Telegraph Company has no franchise in Boonville, and because its service and treatment of its subscribers are reported to have been very unsatisfactory for some time past, the City Council has ordered it to leave the place. Thirty days' notice is granted.

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Editorial Comments

THE LATEST REACH FOR INDEPENDENT PATRONAGE BY THE BELL COMPANY.

WHEN announcement was made a few months ago that the Bell company operating in Ohio and Indiana was willing to retire from the local field in return for the privilege of taking what it could get of the toll business, a great deal of amusement was created among the Independents. They recognized that the company, forced by the effectiveness of the competition which is driving it to the wall, to a realization of its weakness, was endeavoring to turn this weakness into a source of strength by adopting a plan which would effectually prevent further Independent toll line development, thus ultimately giving it an opportunity of gaining control of its competitors one by one by the aid of a complete monopoly of long distance lines which it expected to acquire. Instead of nibbling at the fodder, the Independents passed it by rather contemptuously, and the sub-license agents are still running up and down the state wasting carfare and breath in the endeavor to bring into the fold a few small concerns, operating principally rural lines.

Now the entire organization appears bound to concentrate its forces upon gathering in some of the good money which it believes is going to waste in payment of dividends to Independent stockholders. The Western Electric Company, which is owned by the Bell interests, and has supplied apparatus only to Bell licensees until recently, is going to sell apparatus to any one who will buy it. The only information obtainable concerning this radical departure from the old policy at the present time is that contained in the interview given out by Mr. Vail, the most essential portion of which is quoted upon another page of this issue. From this it is not quite evident whether there will be any string attached to the sale of instruments or not, but it is safe to surmise that in some way purchasers of these instruments will find themselves involved in an entanglement intended to influence them to connect their lines to the Bell system. The precise manner in which this will work out remains to be seen, and Independent telephone men are watching to see if anyone will be so ill-advised as to nibble at the bait and go into the basket.

Although the officers of the American Telephone and Telegraph Company and Western Electric Company refuse to give out any further information than that contained in Mr. Vail's statement, all sorts of unauthorized rumors are afloat. The most interesting of these is that the next step of the Bell organization, which will be forced by the attitude of the public and its stockholders toward the narrow policies of the past management, will be the granting of permission to operating companies to purchase supplies in the open market. If this should be done it is safe to say that there would be a marvelous awakening. The Bell operating companies would have to do a lot of hustling to get in touch with the important advances which have put many of the competing Independent manufacturers so far in the lead, both in the quality of their goods and the promptness of their attention to orders from customers.

THE WIRE CHIEF AND HIS JOB.

IT is a pleasure to watch an able wire chief handle his work when there is a rush of trouble. The work which he has to perform is the kind that is not easy to do, and he often goes through the day under a nervous strain that is sufficient to tax the energy of the strongest of men, but when he goes home at night after a day that represents the skillful handling of his men to clear up a lot of difficult troubles he can rest comfortably with the feeling that he has accomplished something worth the doing. His is the sort of a job which, from the variety of demands which it imposes upon his skill and resourcefulness, is probably found in no other branch of electrical endeavor. The men who can do it well are likely to be proud of the fact that they are telephone men, as they must be in the truest, strongest and best sense of the phrase which briefly conveys so much information.

It would be difficult to locate a position which demands from those who fill it successfully a more complete range of special abilities. In the first place, before a man can use his measuring instruments at all, he must acquire, in some way, not merely a sound knowledge of the elementary principles of electricity, but a specialized knowledge of the application of these principles which covers a field which is far from narrow. Experience develops in a man who is born to the work what amounts almost to an instinct for doing the right thing. Few telephone troubles give absolutely constant indications. Conditions are likely to be changing and in order to locate them correctly one has to, in a measure, catch them on the jump. It is in this work that experience counts for far more than absolute theory, the two kinds of knowledge combined being always essential for high attainment of success.

But the wire chief is a good deal more than a successful tester. In order to be able to direct his men in searching for trouble, it is necessary for him to know a good deal about construction; he must have a pretty sound idea of the way in which the lines are built, of the methods of carrying them through test stations and central offices, and he must know the nature, electrical properties and methods of attachment of all instruments and apparatus which are in any way connected with the lines. His experience with all these devices under both normal and abnormal conditions gives him a means of storing his memory with many special facts which make it possible for him to predict in many cases with most remarkable rapidity what will be found under the most baffling surface indications. These are suggestions of the things which make it possible for a good man to get his lines cleared up and keep them cleared and working as they should work.

In addition to all these matters of strictly telephone and electrical knowledge and experience, come many other matters upon which he must pass a decision at a moment's notice. His knowledge of roads would fit him for a county surveyor's assistant, and in order to get his men promptly on the job he has to keep posted on the schedule time of trains. These require a full knowledge equal to that of any railroad station agent, and moreover the wire chief has in many sections of the country to figure on the exact amount of time passenger trains will be late, or on the minute when freight trains will arrive at certain stations, as all these things are to be taken advantage of in getting his men about quickly in order to clear troubles economically and get the lines to working so that they will continue to earn money for the company. If a lineman goes out into a new territory, there is many a wire chief who will tell him not only where to get a team and where to put it up when he is out on the line, but what horse to take, how fast it will travel and how to humor it so as to get the best speed out of the animal. All of these things are matters of everyday routine which the wire chief knows off-hand and thinks he deserves no special credit for having this information.

From the broader viewpoint of the bearing of his work on the income of the company, and the utility of its service to its patrons, he realizes the necessity of always bearing in mind that economy in clearing line troubles depends upon two factors. In the first place comes the direct expenditure for getting a trouble shooter to the spot where he is likely to find the trouble in the best possible way, with the necessary material for making repairs, and so limiting the cost of his work. In the second place the wire chief must figure on the probable loss to the company of keeping the line out of service, so that by taking both factors into consideration he can produce the results most economical for the company. In other words, he has to balance up probable cost against possible receipts, just as much as other officials, and as the innumerable occasions requiring his judgment arise he must make his detailed decisions on the instant.

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Legal Telephone Matters

CONDUCTED BY A. H. McMILLAN.

RIGHT OF PRIVATE PERSON TO OWN PRIVATE WIRE ON RURAL COMPANY'S POLES.

A Franklin County (Ia.) farmer, named Bolitho, wanted a telephone, but could not agree with the Farm Company already organized there, so started out constructing on his own account. He soon built several lines, and then, not being able to agree with the other members of the company he had formed, sold out to them, reserving the right to maintain a private wire on the company's poles. There are indications that this private wire, which he erected, has since been sold to one Caverhill, a non-resident, but Bolitho still enjoys its use, not as a member of the Rural Telephone Company, but as a private individual owning a private telephone, the only case of the kind in the directory.

At frequent intervals, ever since the private wire has been erected, he has been tapping the party line he was a member of before that time, but has never paid switching fees for this service or been considered an authorized patron of the line. Linemen found the point of tapping last spring, and destroyed it. Within a week it was restored.

The Farm Company decided that he must pay a toll to talk on other lines, and he made a counter-order that farm line patrons talking to him must pay twice as much. No bills have been presented on either side. He is now suing the telephone company for $110. Can he enforce his right to maintain a private wire and also be a free member of the farmers' line? C. F. K.

AS this matter seems to be pending in court, the legal editor hesitates to express an opinion on the subject, and the more so as he has no evidence before him, and you do not state the grounds he sets up in his petition as entitling him to damages. However, we will go so far as to say that he cannot be a free member of the rural line under any circumstances. If he is a member of the rural line he must pay the tolls that other members pay, and in such cases cannot charge the other members for talking to him. If he is not a member, but is the owner of a private and independent line, with one subscriber, viz.: himself, he must pay for all his talks with members, and also have the right to charge the farmers' line when its members talk to him. He would probably not be permitted to charge an unreasonable rate, unless he has a contract for such rate with the line of the company, or unless he had notified them what his rate was before any of the conversations occurred. We do not care to speculate further on this very interesting case.

SUIT TO ENJOIN CONSTRUCTION OF LINES IN PENNSYLVANIA DISMISSED.

AT Doylestown, Pa., a suit brought by Warren Geil against the Keystone State Telegraph and Telephone Company to restrain it from constructing two poles and placing cross-arms and wires thereon upon plaintiff's property but within the limits of the road between the road-bed and the fence line of the road has been dismissed by the Court. The company was a foreign corporation, but had complied with the laws requiring registration of such companies. It had not obtained plaintiff's consent to the location and erection of its lines, but its registration in the office of the Secretary of the Commonwealth gave it the right to construct its lines along and upon the public highways. Lindsey vs. Keystone State Telephone and Telegraph Co., 9 Del. 295.

The Common Pleas Court of Bucks County held that the suit should be dismissed, because it was not averred that the company proposed to erect its line on plaintiff's land outside the limits of the road; but because it had not filed a bond to secure the plaintiff against damages, the company was required to pay costs.

RECEIVER NAMED FOR EAST TENNESSEE TELEPHONE COMPANY.

AT Middlesboro, Ky., a petition in bankruptcy has been filed, asking that a receiver be appointed for the East Tennessee (Bell) Telephone Company. The proceedings grew out of the closing of the Middlesboro exchange and the refusal of the company to give any connections in the city and county. Henry Steele, of Middlesboro, was appointed receiver and will operate the exchange until the new company, which has secured a franchise, will be ready to furnish service.

TEXAS LAW REQUIRING CONNECTIONS.

ON August 10, a new law went into effect in Texas relating to the exchange of messages between telephone and telegraph companies in the State. The second section of the act is as follows:

All companies, individuals, firms or corporations, doing a telephone business in this State shall be compelled to make physical connections between their toll line at common points for the transmission of messages or conversation from one line to another. Such connection must be made through the switchboard of such individual, company, firm or corporation, if any is maintained at such points, so that persons so desiring may converse from one point on one of such lines to points on another.

The third paragraph provides that all telegraph companies shall, if there is any other company engaged in the same business at the same place, furnish means for conveying messages coming to such points on the lines of such other companies to their final destination. In no case shall any messages be transferred from one line to another against the will of the company first handling it when it is possible for the latter company to deliver the message direct. Neither is any company compelled to receive from the wires of any other company any message originating at any point on its own lines.

It is the understanding of the telephone companies that, under this law, they will not be obliged to make connections at points where competing companies are doing business.

ALL FOREIGN COMPANIES IN TENNESSEE LIABLE FOR CORPORATION TAX.

ATTORNEY-GENERAL GATES, of Tennessee, has decided that telegraph and telephone companies whose lines enter or cross that State are liable for the corporation tax provided for by the last legislature of the state. In the case of the American Telephone & Telegraph Company, which operates long distance lines in and through Tennessee, but handles only interstate traffic, the Attorney General says they are just as liable for the tax as a company doing local business. The company claimed exemption from the provisions of the law on the ground that it did no exclusive interstate business and handled only intrastate business over which the state had no control. Having filed a copy of its charter in the state, however, the Attorney-General instructs the Secretary of State to proceed to collect a tax of $150 from the company. The opinion further states that any corporation having asked for and been granted the right to do business in the state is liable for the tax no matter whether it does business or not.

DESIGNATION OF STREETS IN NEW JERSEY.

If a Common Council refuses to designate the streets that our newly organized company may use, what rights have we? May we go ahead and erect our line without waiting for the council to take action? The Aldermen have delayed so long that we believe they do not intend to make the designation, and some have personally stated that they did not intend to give us any rights in the city. A. C. CO.

IF a company applies to the Common Council the statutes provide that the latter must designate streets that form "practical and suitable continuous routes ————, commencing and ending upon a public highway ———— with regard to the improvement of facilities for telephone communication." If the Common Council does not designate such a route in fifty days the company may apply to the Circuit Court, which shall, after due notice, make the designation. It is unlawful for a company to build without the designation of the route having been made. Amended Laws, 1900, Sections 21, 22.

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The Increased Cost of Telephone Service Per Unit Line with the Increase of Subscribers

Opinions of Men High in Authority, Collected and Furnished for Publication by the International Independent Telephone Association

AN ABSTRACT FROM THE REPORT OF THE MAYOR AND ALDERMEN OF AMSTERDAM ON THE TELEPHONE TARIFF.

CONTRARY to what one observes with other business, with the telephone the expenses do not decrease in proportion with the increased number of subscribers, as every new subscriber requires new capital charges, on which interest has to be paid, and on which depreciation has to be written off; further, the expenses of the service are not only increased by that amount which is required for attending to the new subscribers, but, also with the additional cost incurred on behalf of the older subscribers. How large this amount will be is difficult to say at present, but this is certain that by an increase in the number of subscribers the number of combinations to be made on the multiple switchboards will increase to such an extent that an increase of the service expense per subscriber must naturally result.

FROM THE REPORT OF THE COMMISSION OF THE IMPERIAL GERMAN POST OFFICE.

FURTHERMORE, it must be remembered that the expenses of the telephone system increase not only absolutely but also relatively in proportion to the increasing extension, inasmuch as, especially in larger towns, the increase in the number of subscribers augments the expense of each single subscriber, on account of the installations of the exchanges becoming even more complicated.

STATEMENT BY EDWARD H. BOUTON, PRESIDENT OF THE MARYLAND TELEPHONE & TELEGRAPH COMPANY OF BALTIMORE.

IT has been found that, contrary to almost all other kinds of business, the operating expenses per telephone increase with the number of telephones in service, for that reason, that as the number of telephones increases the amount of use to which each telephone can be put is correspondingly extended, so that the operating expenses per telephone of the Maryland Telephone & Telegraph Company's Baltimore plant are more than twice as much as those owned by the same company in exchanges located in smaller towns. The investment per telephone is also increased, for the reason that a greater number of trunk lines between exchanges are needed, and the construction of the switchboards is much more elaborate and expensive. The increased cost of investment means not only additional interest charges, but increased maintenance, an item of very large expense in the telephone business.

STATEMENT MADE BY LORD STANLEY, POSTMASTER GENERAL OF GREAT BRITAIN, SPEAKING OF THE NATIONAL TELEPHONE COMPANY'S PROPERTY.

THE growth of the system has greatly increased its value to subscribers, but the cost of construction and maintenance has increased in even greater proportion, and this must necessarily be the case in every growing exchange system.

ABSTRACT FROM THE REPORT OF THE COMMITTEE ON GAS, OIL AND ELECTRIC LIGHT, TO THE CITY COUNCIL OF CHICAGO, SEPTEMBER 3, 1907.

THE average person does not understand why it costs more per telephone to supply service in a large city than in a small city. The assertion of this principle to many seems a paradox. It is regarded as contrary to the ordinary principle of business—that is, that the unit cost becomes less as the volume of business done increases. It is but natural to think that the wholesale principle ought to apply in the telephone business as in other lines. This idea prevails because the ordinary individual does not undestand the peculiar features of the telephone business, and does not look beyond the telephone on the wall or on the desk. He does not take into consideration that the real business of a telephone company is to furnish service, transmit messages, and not merely to rent instruments. This prevailing idea has been constantly brought home to members of the committee by having their attention called by people thus uninformed to the lower rates existing in other cities; cities between which and Chicago there can be no common basis of comparison.

Every line added to a telephone system requires the addition of telephone central office equipment to every other line in the exchange, so that the new line may be connected to any one of the existing lines.

For every line added to an exchange, the company must not only handle the additional calls originating from that line but must provide for the additional calls originating from existing lines to the new line. The average number of calls per telephone increases with the opportunities presented for calling.

The size of a switchboard to serve a given number of subscribers depends upon the number of messages handled and not upon the number of subscribers. It is also true that the number of operators necessary depends upon the number of messages sent and not upon the number of subscribers.

The greater volume of the business is transacted in a comparatively short period of time. The plant must therefore be constructed, and the operating force provided, to meet the business demands of the high tension hours—to meet the "peak." If the increased business of the busy hours could be spread over the full business day it would greatly decrease both the investment necessary and the cost of operation.

An enlarged exchange means an enlarged area covered and, therefore, added length to subscribers' lines. This requires a proportionate increase of investment for wires and equipment.

EDITOR'S NOTE.—These opinions form valuable copy for newspapers. Managers of Independent companies should distribute them in this way, and send marked copies of papers to the International Association.

TELEPHONE USERS IN ABILENE, TEXAS, RUSH TO INDEPEPENDENT COMPANY.

WHEN the Southwestern (Bell) Telephone & Telegraph Company announced on October 1 that it would raise its rates from $1.00 to $2.00 per month everyone who had an instrument connected to its lines began to wonder what would be the quickest way of having it taken out of his house or place of business. The Bell company has for some time past been subjected to the very vigorous opposition of the Roberts Telephone & Electric Company, of which C. W. Roberts is president and general manager. The Bell rates were very low, and when it was obliged to make them equal to those charged at many non-competitive points under the terms of the new Texas law, it exactly doubled its charges for residence service. Mr. Roberts charges his same old dates, $3.00 per month for business telephones, a special office rate of $1.50, and $1.00 per month for residence instruments. Equipped with a new common battery board, and other improvements, which have not long since been installed, the company is fully prepared to give the people of Abilene the service they want. Mr. Roberts when asked about the situation was so busy that he had no time to talk, and simply said: "Rushed to death with orders. They are falling over each other to get to me. They come in droves of six to ten at a time."

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Important Telephone News

RUSH OF BUSINESS TO INDEPENDENTS ONE OF THE EFFECTS OF TEXAS ANTI-PASS LAW.

DURING the adjustment of rates by the Bell company in Texas the Independent organizations are reaping a fine harvest of orders. The Southwestern Telegraph and Telephone Company of Texas is said to have been kept busy since the anti-pass law went into effect taking out telephones which had been placed at cut rates or given for services rendered by people of influence.

At Waco it gave notice of an increase in the business rate thinking it could carry the measure through before the Texas Telephone Company could put in additional switchboard equipment and cables, but in this it was mistaken, as General Manager J. B. Earle of the Texas company gave orders to set up an auxiliary transfer board and split the pairs of his present cables pending the arrival of more equipment. He has installed three hundred new telephones during the past thirty days and has orders for nearly that many more, with the end not yet in sight. The Texas Telephone Company is doubling its present capacity all the way through.

At Orange, Texas, the Southwestern company attempted to adjust rates and up to the present time has taken out 169 telephones and has orders to take out 60 more.

At Paris, Texas, there was another adjusting of rates and resulted in the Citizens Company being swamped with orders. This company has installed over 250 telephones in the past thirty days, and has about 100 on the waiting list, having run entirely out of switchboard and cable capacity.

LEADING CITIES OF AUSTRALIA NOW CONNECTED BY TELEPHONE.

MELBOURNE and Sydney, the two leading cities of Australia, are now connected by telephone, the line having been officially declared open on July 10, 1907. The line is a little over six hundred miles in length and is constructed of heavy copper wires, the circuit being full metallic; the cost of construction was $227,198, and the time of building four months. U. S. Consul General John P. Bray reports that the toll rate, $1.46 for three minutes, is thought to be too high in business circles, but the postmaster-general, by whose department the line is controlled, has stated that if after a three months' trial the line proves profitable a series of progressive reductions in the rate will be made.

BELL COMPANIES TO MAKE A DETERMINED BID FOR INDEPENDENT MONEY.—WESTERN ELECTRIC WILL TRY TO DISPOSE OF APPARATUS IN OPEN MARKET.

THE Western Electric Company has at last made the long expected announcement that it will sell apparatus to telephone companies without any restrictions whatever upon the amount or kind of goods and irrespective of the purchaser's affiliation or lack of affiliation with the Bell organizations.

In a newspaper interview given out at Boston on October 2, President Theodore N. Vail of the American Telephone and Telegraph Company confirmed this report. Men connected with Independent companies who have read the interview are pointing with considerable amusement to a passage in the interview which reads as follows:

"In reply to a question as to the probable effect of this action on the revenues of the American Telephone and Telegraph Company, Mr. Vail said that no considerable direct increase was anticipated, but that a great indirect advantage was looked for from improved relations between the public and all of the associated Bell companies, because there has been an entirely erroneous idea more or less prevalent, that the charges of these companies for their services were based on a monopoly of telephone instruments, while the fact is that the instrument is but a small part of the plant required in giving telephone service. It is felt that this action may cause it to be more clearly understood by the public that the Bell companies' only claim for patronage is based on their ability to furnish the best service at reasonable prices and not on any instrument monopoly.

"Mr. Vail explained that at the present time many inefficient telephone instruments are in use on local and private lines and that the Bell companies desire to see these replaced by standard instruments in order that it may make traffic connections with the greatest possible number of properly equipped lines, assuring proper service and transmission. For example, there are thousands of so-called 'Farmers' lines' which will furnish valuable feeders for the toll lines of the larger system when properly equipped and maintained. This situation can now be provided for through the sale outright of Bell instruments and apparatus."

Aside from the fact that the Bell company will undoubtedly be glad to have any money which it may be able to pick up as a direct profit on the apparatus which it sells, the Independent men are pointing to the last paragraph quoted above as the nub of the whole proceeding. They say that in spite of the very considerable number of sub-licensees which are now receiving service from the Bell lines, the large organization realizes that these people regard their inability to purchase all supplies in the open market as burdensome. They are objecting to the payment of the annual rental for transmitters and receivers. It is understood that the company believes that this is the sole reason why it cannot obtain more sub-license contracts and that it can overcome this objection by selling to all purchasers outright. It seems to be a fact, however, that even the present sub-licensees are saving money by buying practically all of their apparatus in the open market and are only retaining their connection with the Bell lines until Independent toll lines can be built.

CITIZENS OF DICKSON, TENN., BASE APPEAL FOR LOWER RATES ON INCORRECT GROUNDS.

THERE has been trouble for some time between citizens and the Cumberland Telephone Company at Dickson, Tenn., in regard to rates. The public has contended that charges have been too high ever since the inauguration of the system and that rates have uniformly advanced. In view of the growth of the system it is contended that rates should have been reasonably decreased. Apparently it is not understood that the cost of giving service increases as the plant grows. It is not unlikely that efforts will be made to establish a local company unless some satisfactory terms can be reached.

STRONG INDEPENDENT DEVELOPMENT AND ORGANIZATION IN MICHIGAN SHOWN IN NEW HANDBOOK.

OFFICERS of the Michigan Independent Telephone Association have just completed and published a new handbook of general information, which not only puts a lot of useful facts before their associates who are members, but cannot fail to show to the general public the exceedingly strong position which has been attained by the Independent telephone companies operating in that State. There is so much information in the book that we can do no more than convey an idea of the plan of preparation as shown by the substance and arrangement of its text.

A condensed Independent telephone history of Michigan is given near the front of the book, with an outline of the principal events leading up to the present conditions, where the telephone business of the State is handled by 112 Independent telephone companies, whose lists of stockholders include the names of 10,306 people, and which own 78,494 telephones, 333 exchanges, 897 toll points, 4,854 circuit miles of copper toll lines, and 5,001 circuit miles of iron toll lines.

These companies are not only working harmoniously in ad-

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vancing their common business interests, but are bound together by their allegiance to the Michigan Independent Telephone Association, and are aided in their operating and accounting by the Michigan Independent Telephone Traffic Association. The Michigan Telephone Managers' Association furnishes a means of bringing the members together for technical discussions.

President E. B. Fisher's address at the tenth annual convention of the Telephone Association in March, 1907, printed in this book, gives in a clear and definite form the key to the activities of the Independent telephone companies which have resulted in such great progress. The book includes the names of all officers, both general and district, of the Michigan Independent Telephone Association, the names of the companies which are members of the association and its constitution. A more complete directory of the companies gives the names of all Independent companies, date of organization, number of stockholders, headquarters, names of officers, list of exchanges and toll stations operated, together with the numbers of telephones and circuit miles of copper and iron toll lines. The magnitude of the Independent business in the State is suggested by the fact that this directory of companies, containing such brief information in the form of compactly arranged lists, occupies no less than thirty-six pages of the book.

In the back of the handbook are included reprints of a number of addresses, the text of which has become well known to most telephone men, including Mr. Moellering's Chicago convention address, entitled "Independent Telephone Securities as an Investment," and a paper on "Our Rural Friends," by A. B. Fishback, read before the Michigan Independent Telephone Convention. The traffic agreement of the Michigan Independent Telephone Traffic Association and a paper on the plan of organization and work of the association by President C. E. Tarte, are included in the book, as well as a list of the members of the association. Following this is a group of other papers which have been read at conventions, including those on "Improving Toll Line Service," by H. T. Clough, and "The Standardization of Toll Line Equipment," by W. J. Stanton, of Waterloo, Ia. An outline of the organization of the Independent Telephone Managers' Association of Michigan, with a list of the members, is followed by Mr. Charles H. Hood's address on "Getting Business," published some time ago in AMERICAN TELEPHONE JOURNAL, which closes the text pages of this interesting and useful book.

THE RED JACKET TELEPHONE CO.,
Shortsville, New York.

American Telephone Journal,
100 *William Street, New York.*

Gentlemen:—

After a long time we have the pleasure of handing you herewith $2 currency in full for our subscription to your paper from July 2, 1906, to July 2, 1908.

We thought we could get along without it, but we find that every week it contains something of such interest to us as to make it necessary and we bow to the inevitable.

Yours truly,
RED JACKET TELEPHONE CO.,
OLIVER S. TITUS,
TREAS.

When a man decides to discontinue his subscription as soon as he can pick out a bad week we are bound to keep him guessing. This subscriber is sure that every week is a good week, and his compliment is accompanied by cash!

MOVEMENT TO HAVE PUBLIC SERVICE COMMISSION IN NEW YORK STATE CONTROL TELEPHONE AND TELEGRAPH COMPANIES.

SENATOR PAGE, of New York State, who led the fight for the passage of the Public Utilities Bill, commonly known as the favorite measure of Governor Hughes, is reported to be authority for the statement that telephone and telegraph companies will be included under the provisions of this act, under new legislation to be passed during the coming winter. In an interview Senator Page is said to have made the statement that it had been asserted that friends of the Public Utilities Bill were, during the last session, afraid of the added opposition of the telephone and telegraph companies. He denied that there was any truth in such a statement, and said that the transportation interests had opposed the bill so vigorously that any further opposition would not materially affect those who favored the measure. While the Public Utilities Commission does not wish to take too much upon its hands at the present time, there seems to be considerable demand for the regulation of telephone companies on account of poor service, and it is said that an attempt will be made to provide for giving the commission powers for the regulation of service and rates during the coming controversy.

SOUTHWESTERN (BELL) TELEPHONE COMPANY PROMISES TO BE GOOD IF ITS EL PASO FRANCHISE CAN BE RETAINED.

WHEN the Bell company operating in Texas found that the city council and Mayor Sweeney of El Paso meant business, and would revoke its franchise if their demands were not complied with, the company is reported to have assumed a tame and gentle demeanor very promptly. General Counsel A. P. Wozencraft, of the Bell telephone company, appeared at the hearing on the telephone franchise violations set forth in the Mayor's message on August 5th, and announced that the company was ready to spend one hundred thousand dollars in the city in order to meet the requirements of the council and give better telephone service.

The first charge considered at the hearing was that of rendering false valuation of the company's property subject to taxation in the city. It was alleged that the company, which had reported $86,000 worth of property, was in reality the owner of a plant worth half a million dollars, and that by these false statements it had defrauded the city out of over $5,000 annually. The company made the defense that while it was admittedly in the wrong in giving a false valuation, the city did not require it to render a true valuation, and that it had simply been endeavoring to give the same per cent. of valuation as all other corporations in the city. In response to demands of the council, it had to agree that it would furnish specific information in regard to all charges, in order that the council might have definite facts for considering what action would be appropriate in relation to the continuance of the franchise.

The present inquiry into the valuation of the property arose from a desire to determine whether the company was doing a fair thing by its subscribers in raising its rates.

DULUTH TELEPHONE COMPANY HAVING LABOR TROUBLES.

BECAUSE the Duluth (Bell) Telephone Company has refused to employ union linemen, and accord them eight hours a day and other concessions, it is meeting with strong opposition from the local Electrical Workers' Union. Recently the Trades Assembly came into the fight and sent out circulars to all business men who are patrons of union labor. This circular urges that business men shall not talk over Bell lines.

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FOR SALE.—Telephone exchange and from 100 to 200 miles long distance line in Missouri, making good money; for sale at a bargain. Full particulars and satisfactory reason for wishing to sell on application. Address Box 932, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 932

FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—First class telephone and telephone supply salesman to travel in Texas and Oklahoma, for Dallas house. Man of undoubted capability will be permitted to invest from $2,000 to $4,000 in stock of company that is rapidly enhancing in value. Address Box 939, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 939

WANTED—First class, experienced telephone factory superintendent to take entire charge of small telephone factory. The right man will have good opportunity for advancement and will be allowed to secure stock in company if desired. Address Box 938, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 938

LIVE, hustling superintendent of company operating three counties desires managership of plant up to two thousand lines. Ten years' experience in every detail, executive and construction. Will guarantee to produce new business and lower outstanding collections. Position accepted on trial to prove ability. Thirty days' notice required. Locality no objection, but prefer North or Southeast. Address Box 940, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 940

POSITION wanted by married man with fourteen years' experience on local battery and construction work. Want steady employment after Jan. 1st as troubleman or manager. References given. Address Lock No. 30, Wilton Junction, Iowa. 941

WANTED—After October 1st, position as exchange manager. Ten years' experience in large and small exchanges. Address Box 936, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 936

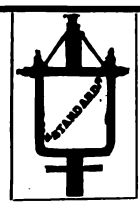
WANTED—Chief operator for central energy plant of 5,000 subscribers. Must be able to handle operators and understand switch room work. Good salary to proper party. Address Box 935, care AMERICAN TELEPHONE JOURNAL, New York. 935

CASH paid for telephone photographs.—Telephone engineer wishes to secure photographs of standard and new methods of open wire line and aerial cable construction, conduit laying, manhole building, etc. Will pay 75 cents each for acceptable "solio" prints. Address, Box 902, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 902

WANTED.—Two or three good telephone men for troublemen or managers of magneto exchanges of 100 to 300 subscribers. Wages $30 to $50 per month. State experience and give reference. S. H. Young, Sparta, Tenn. 934

ENGINEER who can lay out and superintend the construction of underground and aerial, telephone systems for permanent economy is desirous of making change. High class propositions only will be considered. Address Box 937, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 937

Telephone Wire and Cables



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John A. Roebling's Sons Co., Trenton, N. J.

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Transfer System—Battery Values

TRANSFER SYSTEM AND CONNECTIONS OF BATTERY.—(928.)

1. We have a system that has grown from a two hundred magneto board of two positions to one of eleven positions, non-multiple. Our exchange equipment is in first class condition, and we do not believe that it will be necessary to replace it with a common battery multiple board for two or three years yet. The great trouble that we are experiencing at the present time is on the transfer proposition. We have order buttons on each position so that the operator can cut in on any other operator and order up the desired number. This worked very well when our board was of about six or seven positions, but now there is a great deal of confusion among the operators. Very often two or three will get in on the

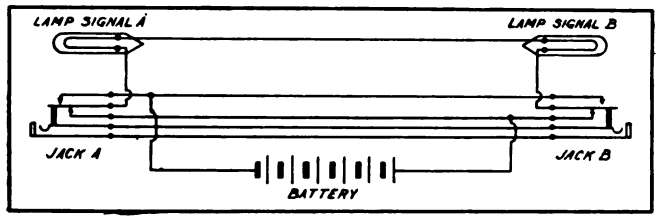

Fig. 928a.

same order button at the same time, and the receiving operator will be unable to catch the numbers desired or be able to assign the trunks.

We have an idea that the situation would be relieved somewhat if we were to install double lamp transfers and cut out the order buttons and trunks altogether. Will you kindly outline a system of this sort that will work satisfactorily under the conditions we mention.

2. Will you also kindly explain the reasons for the different methods of connecting batteries so as to increase the voltage or amperage as desired? That is, explain the reason for securing the results one does by altering the connection from series to multiple and multiple series.

E. I. L., Mo.

The result you desire to secure may be accomplished by use of double lamp transfer circuits as diagramatically shown in Figure 928*a*. By tracing this circuit you will note that upon the insertion of a plug in either jack *A* or *B* both of the lamp signals will be caused to glow and that when a plug is inserted in the other jack the lamp circuit will be broken and both signals will be extinguished.

Thus you will note that the transfer trunk is operative in either direction and that a plug inserted into or withdrawn from either jack will cause an actuation of the signal lamps simultaneously. By having this arrangement of apparatus either operator will be able to call the other and also to advise of the termination of the conversation so that trunk may be cleared.

2. The terms that were formerly used to designate these methods of connection will in a measure answer your question in relation to batteries. The series connection was formerly called the connection for intensity or force and the multiple connection, the connection for quantity. In Figure 928*b*, *X* represents six cells of battery connected in series, that is the negative pole of each cell is connected with the positive pole of the succeeding cell and the positive and negative poles at the extreme ends are connected by conductors with the external circuit.

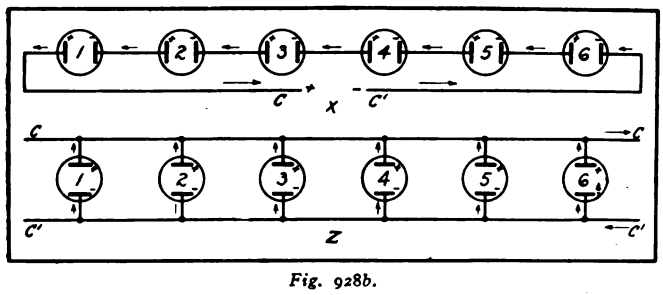

Fig. 928b.

The resistance of such a connection is equal to the sum of the resistances of all the separate sources and the electromotive force is equal to the sum of the separate electromotive forces. Thus, if the electromotive force of a single cell is equal to *E*, its internal resistance to *r* and the resistance of the leads and apparatus in the circuit to r^1, then the current in the circuit is

$$C = \frac{E}{r + r^1}$$

If six such cells are connected in series, the current becomes

$$C = \frac{6E}{6r + r^1}$$

but if the internal resistance of each cell is so small that it may be neglected, the formula becomes

$$C = \frac{6E}{r^1}$$

or the force of the current is six times as great as with one cell. The series connection of cells is used where a high electromotive force is required.

The connection of the six cells in multiple or parallel circuit is shown at *Z* in Figure 928*b*. The electromotive force is the same as that of a single cell. The internal resistance of the entire battery when so connected is as much less the resistance of any single cell as the area of the combined negative or positive plates is greater than that of any single negative or positive plate.

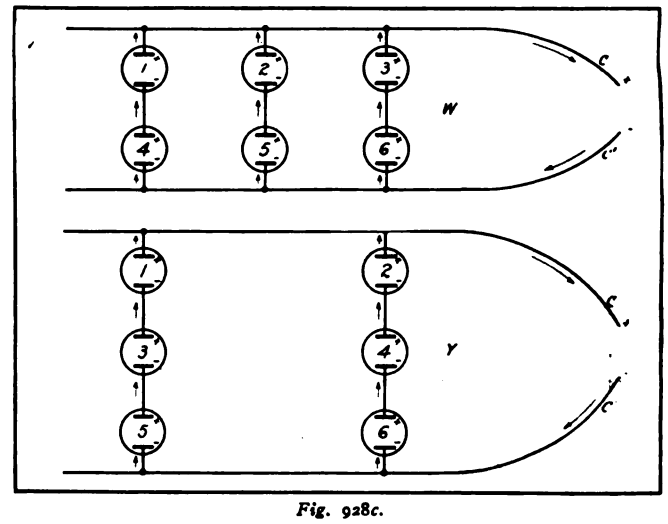

Fig. 928c.

In the case of six cells, the current of the battery will be

$$C = \frac{E}{\frac{r + r^1}{6}}$$

where *E* is the electromotive force, *r* the internal and r^1 the external resistance. When strong, or large currents of low electromotive force are required, connections in multiple are generally employed.

In Figure 928*c* *W* represents a multiple series circuit of the six cells, in which three separate groups of two series connected cells are coupled in multiple. The electromotive force of the battery will be increased in proportion to the number of cells in series, and the internal resistance decreased in proportion to the number of strings in parallel, or

$$C = \frac{3E}{\frac{3r + r^1}{2}}$$

Diagram *Y* in Figure 928*c* shows the six cells arranged in two groups of three series-connected cells and those groups connected in parallel. Calling *r* the resistance of each separate cell, the total resistance of the multiple-series circuit con

(*Continued on page 243.*)

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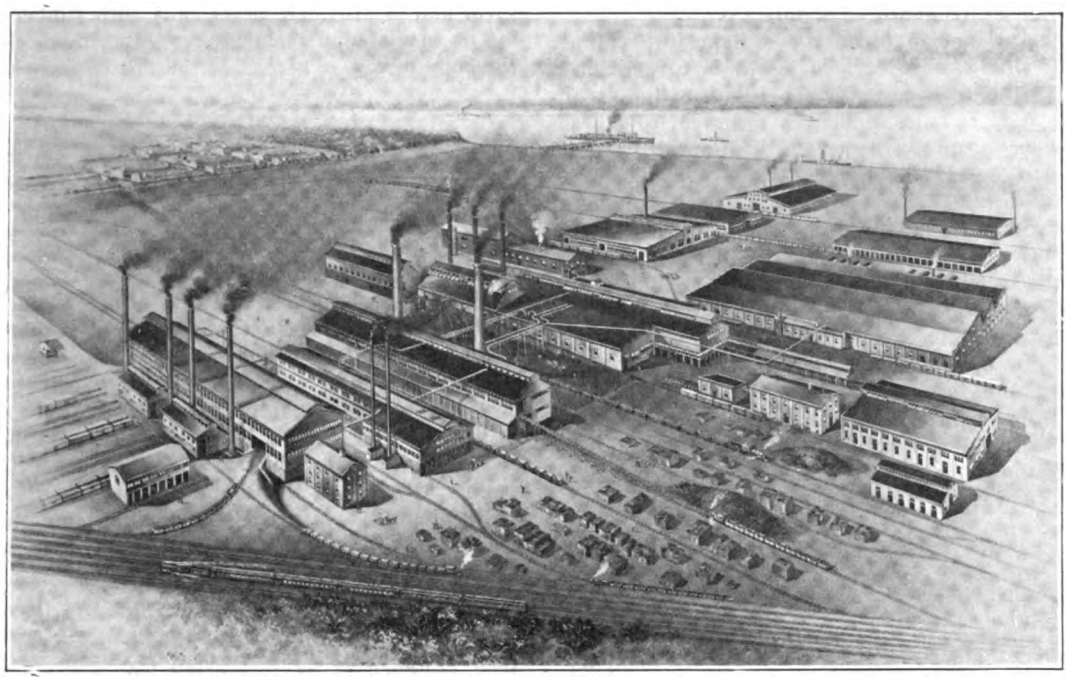
Kinkora—The New Roebling Plant

GREATLY increased facilties for the production of wire and wire rope are afforded the John A. Roebling's Sons Co., by the building of the new Kinkora works, about ten miles south of the main works at Trenton, N. J. The additional works are on the line of the Pennsylvania Railroad from which spur tracks extend into the yard.



The New Roebling's Wire Plant at Kinkara.

An entirely new town for its employees has been built upon fields in the open country near the works. This town, with buildings of brick and stone, has wide streets and roomy houses. Water works, electric light station, buildings for religious worship and secular entertainment, a school house, hotels, a public park, recreation grounds and other conveniences of a thoroughly modern city have been erected by the company. The new post office established in the town bears the name of Roebling.

The additional works and their equipment, as well as the new town, were designed by the engineering force of the John A. Roebling's Sons Co., and built under the direct supervision of Mr. C. G. Roebling, its president.

The efficiency of the workmen living under these helpful conditions, and the perfection of equipment of the new works will have a notable effect upon the immense business done by the Roebling company.

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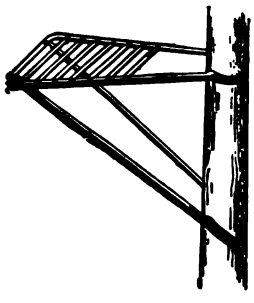

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Latest Inventions

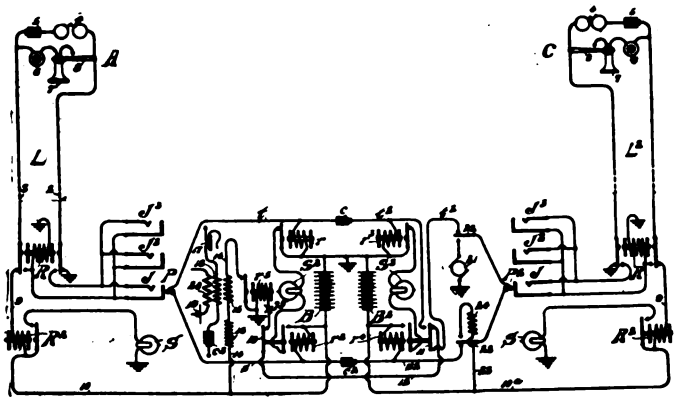
SYSTEM FOR BUSY TEST.

W. W. Dean, Chicago, patent 867,349, October 1, 1907, assigned to Kellogg Switchboard & Supply Co.

This invention relates to a testing system for multiple board telephone lines, one object of which is to provide a system in which the responsive device is normally disconnected from the cord circuits, so that in the event of a leakage occurring on a position, the entire position will not be thrown out of use.

The instruments *A* and *C* are connected to the switchboard in the customary manner and the subscriber desiring a connection makes his call and is connected with the operator's talking set in the usual way.

Upon learning the line wanted, the operator tests it in the usual manner by touching the tip of the calling plug P^2 to the test ring of one of the multiple jacks of the wanted line. If busy the test rings are connected with the line pole of either battery *B* or B^2 through the sleeve strand of the connected cord circuit and a flow of current takes place over the forward portion of the tip strand t^2 of the testing cord, through spring 11 of relay r^4 conductor 12, spring 13 of relay



r^3 and thence through the high resistance test relay r^3 to ground. This relay is of such resistance and impedance as to prevent a large or sudden variation of current upon the tested line so that subscribers will not be annoyed by the testing operation. The test relay responds to the current over this path and breaks the local circuit that is normally closed from the live pole of battery *B* over conductors 10 and 14 to ground through the normally closed contacts of the test relay r^3. The breaking of this local circuit which includes the tertiary winding 15 of the operator's induction coil causing a click in the operator's receiver, thus informs her that the line wanted is busy.

ANTI-HUMMER ATTACHMENT.

N. O. Hagen, Pekin, North Dakota, patent 866,645, September 24, 1907, assigned one-half to O. O. Forde, Pekin, N. D.

This patent covers a device which has for its particular object the elimination of the humming noises caused by telephone wires being attached to frame buildings.

The body of the device is made up from a section of rubber hose 5 that is bent into an approximately U shaped form and is provided at its ends with rubber plugs 6.

The insulated wire 2-3 is passed through the plugs 6 and the body tube 5. The end of the line or main wire I is tightly

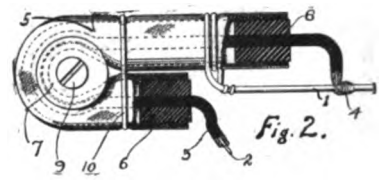


Fig. 2.

coiled around the longer end of the tube 5 and is twisted back upon itself, so that it is securely anchored to the tube 5.

In securing the device to a building, the tube 5 is bent around a knob 7 which is secured to the building by the screw 9. A yoke of iron wire 10 is secured around the ends of the tube 5 to securely hold it in place upon the knob 7.

The device thus fashioned will, so states the inventor, thoroughly absorb and thus eliminate the disagreeable humming noises before mentioned and at the same time thoroughly insulate the line wires from the building to which they are attached.

ELECTRICAL CIRCUIT PROTECTOR.

C. A. Rolfe, Rochester, N. Y., patent 867,212, September 24, 1907, assigned to Rolfe Electric Co.

This device comprises an electrical circuit protector of the ground-carbon and heat coil combination form. The protector consists of a removable cartridge 2 containing a self soldering protective mechanism 16, which is operated by the passage of an unduly strong current. This cartridge is mounted in suitable contacts 3 and 4 which are so arranged that the cartridge is in a vertical position. When an unduly strong current operates the cartridge, the circuit is opened within it and suitable ground and alarm circuits are closed by additional contacts.

The carbon 26 makes contact with the line springs 24 and

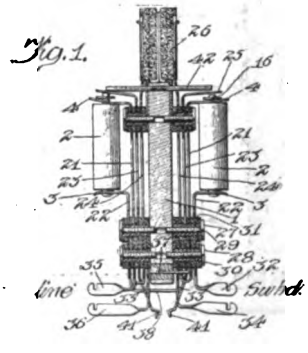


Fig. 1.

the ground connection 1. There are interposed between the blocks of carbon, suitable strips of mica or other non-conducting material perforated in such a manner as to allow a passage of a high potential surge to the ground.

TRANSFER SYSTEM AND CONNECTIONS OF BATTERY.—(928.)

(*Continued from page 242.*)

taining three cells of battery in parallel and two in series is

$$R = \frac{2r}{3}$$

for three in series and two in parallel.

$$R = \frac{3r}{2}$$

Therefore, if the circuit of the battery thus connected be closed by a resistance equal to r^1, the current would be, in the case of the connection *W* in Figure 928c.

$$C = \frac{2E}{\frac{2r + r^1}{3}}$$

Thus you will note that the series-multiple connection of batteries is employed where it is desired to increase both the force and the amount of the current.

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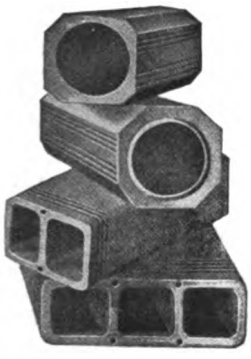

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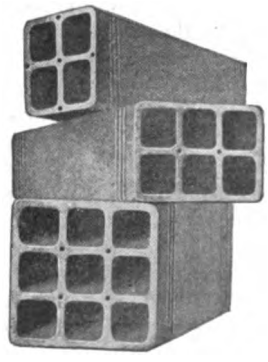

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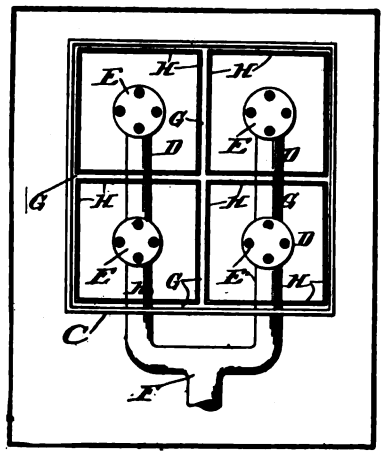
With the Manufacturers

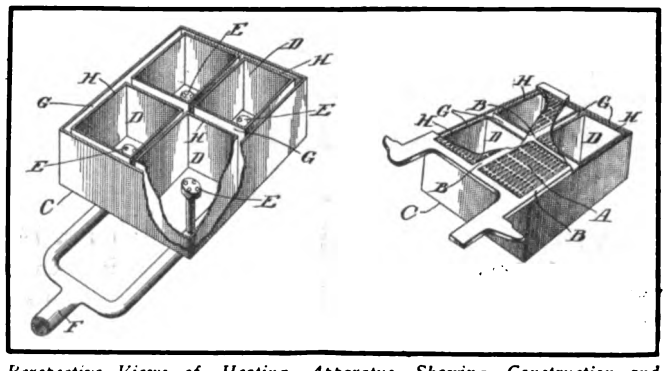
A NEW METHOD OF INCREASING THE LIFE OF STORAGE BATTERY NEGATIVES.

BY an invention of Joseph Bijur, the General Storage Battery Company of New York has developed a method of treating negative pole plates of storage batteries which it claims affords a means of very materially increasing the life of these plates. The company's investigations into the deterioration of storage batteries brought out the fact that the loss in capacity is largely due to a closing up of the minute cells in the negative plate of spongy lead. This closing is due to the property by virtue of which two bright lead surfaces, when brought together under the conditions existing in a storage battery, will adhere to one another, and so any expansion or contraction of the plates which once brings the surfaces of a cell together serves to permanently close the cell and render it useless.

The union of the two surfaces will be prevented, so Mr. Bijur has found, by partially coating them with an inert material of suitable character. In this way the original amount of working surface can always be maintained, and the porous character of the spongy mass preserved in such a way as to insure a permanent network of passages for the diffusion of the electrolyte. Accordingly, in working out a means of accomplishing this result, he developed the method described in U. S. Patent No. 845,391, which consists in treating the plates in such a manner as to insure a deposit of inert material on the walls of the cell after the plates have been otherwise completed. The plate is soaked for ten minutes in a sugar solution, which permeates the mass and fills up the pores. The plate is then removed and dried in the open air; if formed entirely of lead, it is then baked in a suitable apparatus at a temperature of from 240 to 300 degrees Centigrade, until the sugar is substantially completely carbonized, an operation which takes about five or ten minutes. If the plate has antimonious alloy parts, as, for instance, an alloy frame melting at a lower temperature than the remainder of the plate, special methods are required, and a heating apparatus similar to that shown in the accompanying diagrams is employed. In these drawings *A* represents the plate, *B* the alloy frame. The apparatus comprises a frame work *C*, of sheet steel, having compartments *D*, under each of which is a gas burner *E*, connected to a supply pipe *F*. In the preferred form of the invention the frame work *C* is double, and provided with air-spaces *F*, between the walls *H*. The compartments are all substantially of the same size as the grids on the plate, so that when the plate is set in place on the frame work only the portions which are to be active in the battery are heated to the full temperature obtainable. After the plate has been heated in the manner described it may be rinsed to remove any inconverted particles of sugar, and it will be found that the interior cells have an exceedingly fine uniform coating of minute particles of carbon dust, which prevents the adhesion of the walls of cells when these are brought in contact with each other during the operation of the battery. A Planté plate treated in this manner has a light brownish gray color instead of the lead gray color usually observed.



Plan of Heating Apparatus Used in Treating Bijur Storage Battery Plates.



Perspective Views of Heating Apparatus Showing Construction and Method of Mounting Bijur Plate for Special Treatment.

CUTTING OUT TIME LOSSES IN DEPARTMENT STORES BY INSTALLING A COMPLETE TELEPHONE SERVICE.

AN investigation of any specialized business is likely to show where the telephone can be used to great advantage, not only for the discussion of business with outside persons, but within the establishment itself for the elimination of friction, the saving of time and securing prompt and positive action on innumerable questions of detail which arise without notice during the day. In a recent book dealing with the question of the telephone as a time saver, the following statement concerning the department store service is printed:

"No department store can be handled to the best advantage without an intercommunicating telephone reaching every department. The aggregate of employe's time that a telephone system throughout the house will save in a single day, is enormous. Miles and miles are traveled by the department manager going to the shipping room to see why so and so's package was not sent out; the man in charge of the grocery floor hiking down cellar to find out why a particular stock has run out; the floor walker climbing flights of stairs to ask the general manager some petty questions; the advertising man and his assistants running back and forth all over the entire building trying to get together in time for the afternoon paper the list of prices for the crockery sale. All these people are making confusion passing up and down the aisles; they are wasting time in visiting for a few minutes after the business is transacted; they are fatiguing themselves unnecessarily by climbing up and down stairs; are less efficient in their own work, and are interrupting the work of others."

This seems to be a very thorough statement of the situation, which loses nothing in value by the presenting of the facts in a concise manner. Telephone managers who are anxious to extend the amount of their branch exchange business will find that this booklet will not only be interesting to themselves, but if shown to prospective customers will serve to interest them directly by its statements concerning their own business. Not only the special value of complete telephone service to department stores, but also its principal points of merit in hotels, the home, hospitals, banks, etc., are treated in a direct and interesting way. The booklet is published and mailed free of charge to persons who operate branch exchanges, or who think of installing them, by the Stromberg-Carlson Telephone Manufacturing Company of Rochester, N. Y. Interested persons should ask for booklet No. 80.

THE WIRE & TELEPHONE COMPANY OF AMERICA, Rome, N. Y., receives numerous inquiries from telephone men who wish to know whether the Easophone is manufactured for use on both magneto and common battery lines. The manufacturers state that it is giving good satisfaction when used in connection with a generator, as well as in the very compact set for common battery operation. The company will be pleased to send full information concerning either type.

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Because it is not necessary for the operator to look at the clock at the commencement and ending of a toll conversation. Nor does she waste time figuring and writing elapsed time. An operator actually can handle more calls if the toll board is equipped with a CALCULAGRAPH.

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Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.

SIMPLICITY

Note how easy it is to splice pairs when you use HARGIS CABLE SPLICING JOINTS. Note how easy it is to get into the joint in case you have to test out for trouble.

If you are stringing several lengths of cable and a storm blows up, you can get your cable ends into a moisture-proof HARGIS JOINT in no time and thus prevent moisture from getting into your cables. When the weather clears up, your lineman can go out and splice the pairs in each joint.

While an expert cable splicer is rigging up his platform, etc., to start to work on a horizontal joint, a lineman can wipe in a HARGIS JOINT. The lineman can have all his pairs spliced and be off to the next job about the time the expert splicer would be ready to begin wiping the second end of his horizontal joint.

Making a splice with a HARGIS JOINT is so easy that you don't need a cable platform. There is no need for a drip pan to catch the paraffine, because the HARGIS JOINT is submerged in the paraffine pot, and there is no waste. The moisture has to go out. No uncertainty.

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W. N. Matthews & Brother

Manufacturers of Patented Money Saving Specialties.

214 North Second Street ST. LOUIS

Branches: New York and San Francisco.

A NEW DEAL
AND A
SQUARE DEAL
which insures
Dependability and Permanency

"THE PREMIER SPECIAL"
(Compact Type) Get our prices on this Telephone.

Since our acquisition of the Bigley Telephone Co. we can insure our customers a permanent concern on which they can depend for correct goods, prompt and courteous treatment and a COMPLETE SUPPLY OF ALL PARTS which they may need.

We will not only specialize in

RE-BUILT APPARATUS
FOR TELEPHONE EXCHANGES

but will handle all supplies essential for the construction of a complete plant.

All re-built goods will be thoroughly overhauled and tested and will be guaranteed JUST AS GOOD AS NEW before leaving our hands.

WE CAN SAVE YOU MONEY

—often quite important sums, too,—on every purchase.

Try us on

Rubber Covered Wire, Cable Trolleys, Telephone Signs, Telephone Cords,

and all kinds of Telephone and Switchboard Parts. We handle the celebrated "Premier BB" cord. Remember: We are here to stay and will serve you faithfully and well.

WRITE FOR OUR NEW BULLETIN NO. 7.

Premier Electric Co.

58 W. Van Buren St. CHICAGO

REDUCED PRICE

ON

IRONITE

¶ We have made a reduction in the price of IRONITE Duplex Drop Wire.

¶ It will always cost less than copper and will always be vastly superior for drop work.

¶ No. 18 B. W. G. IRONITE is a satisfactory substitute for No. 14 B. & S. Copper. The tensile strength is much greater, the insulation superior. It will not sag, stretch or break. It costs 25% less.

Durant Electric Supplies Co.

Sole Producers

52 Fifth Avenue, CHICAGO, ILL.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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With the Manufacturers

F. A. CORNELL.

MR. F. A. CORNELL, who has for some months held the position of advertising manager for the Dean Electric Company, of Elyria, Ohio, gained his telephone experience with the Columbus Citizens Telephone Company, and later on with the Western Electric Company, of New York. While with the latter concern he edited a small monthly paper, "The Bulletin," which is distributed at the company's expense as a means of furnishing information to its employees. Mr. Cornell also gained some newspaper experience while he was a student at the Ohio State University, so that he has had the all-round training which is necessary for keeping people posted concerning the merits of telephone apparatus put upon the market by a large manufacturing company.

Mr. F. A. Cornell, Advertising Manager, the Dean Electric Company.

HERMAN BOKER AND COMPANY, 101 and 103 Duane street, New York, issue a booklet containing a great deal of valuable information concerning wire suitable for use in resistances for instruments and electrical devices where accuracy, reliability and permanency are required. The company manufactures resistance material in four different qualities in the form of wire, sheets and tapes, thus covering very fully all necessities met in practice. The booklet gives very complete and interesting information concerning its products, including a number of important tables, and will be sent free of charge to prospective users of material of this class.

THE JACK ANCHOR.

DURANT Electric Supplies Company, 52 Fifth avenue, Chicago, Ill., has put upon the market a new anchor which it claims is going to have a thoroughly practical interest to construction men and managers of telephone plants. The company, in making its announcement, says that it realizes the extent to which telephone men have been led to experiment with many anchors covering numerous types, of which only a few are now recognized as having made good. Still, the Durant Electric Supplies Company has investigated for itself the merits of the "Jack Anchor," and is convinced that it will do the work for which it was designed.

The company believes that it has a product which it can earnestly recommend, not only from the point of view of efficiency, but of economy. The book of instructions which goes with this anchor is said to consist of one sentence, "Bore a hole and drop in a Jack, that's all." The company claims that no setting contrivance is necessary with this anchor. Another statement that seems to tell the whole essential story the company words as follows: "If a pole is hitched to a Jack anchor it will stay hitched." Full information will be sent to interested persons.

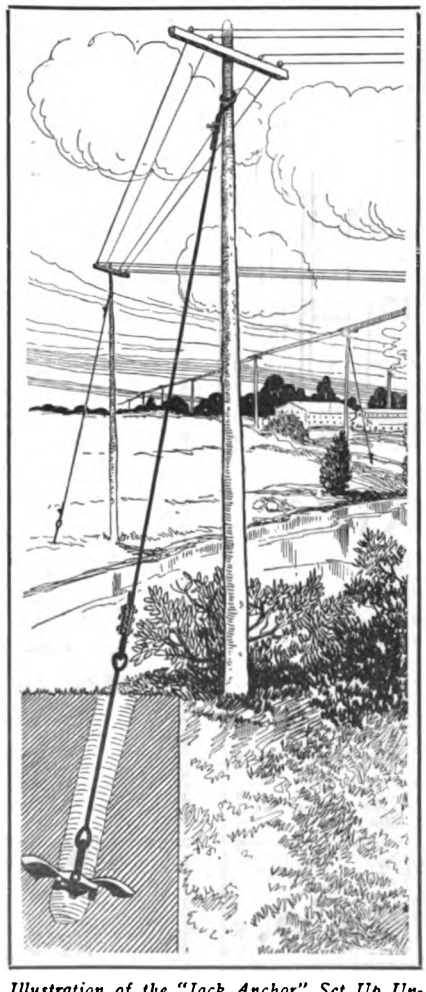

Illustration of the "Jack Anchor" Set Up Under Actual Service Conditions.

FRANK B. COOK, 246 W. Lake St., Chicago, Ill., is emphasizing the value of subscribers' station protectors as a form of insurance. He calls attention to the fact that their installation provides, at the same time, a very reliable form of life insurance, fire insurance and accident insurance. He is sending out a bulletin which gives details of a number of cases where telephone companies have suffered for damages through failure to install and maintain proper protection at subscribers' stations. Managers interested in obtaining information concerning the nature of damage and cost to the responsible telephone companies in these cases will be cheerfully furnished with the desired facts upon writing to Mr. Cook.

HINTS ON INSTALLING A TRAIN DISPATCHING LINE WITH TELEPHONE SERVICE.

ELECTRIC railways are so rapidly adopting the telephone as an aid to train or car dispatching that telephone companies in all parts of the country are finding occasion to gather all the information they can about this class of service. The Blake Signal and Manufacturing Company, 246 Summer street, Boston, Mass., which manufactures apparatus for a system which has had an extensive and, it is reported, a very successful trial under severe conditions in many places, has just published a book which gives much valuable information under the title "Requirements for Efficient Telephone Train Dispatching." All the information required by a person who wishes to take up the matter of securing a contract for installing a system along the line of an electric railway seems to be included in this book. It also shows, in addition to general facts about such a system, the way in which the Blake apparatus is adapted to give a positive, reliable service, in addition to meeting the operating requirements imposed by the special conditions met with in street railway practice. The company has included in this book a number of endorsements from prominent street railway companies, which shows special points of merit in the Blake system which have been shown up in practice.

INDEPENDENT TELEPHONE APPARATUS IN SOUTH AMERICA.

THE Sterling Electric Company, Lafayette, Ind., has an installing force at Lima, Peru, South America, installing a 3,600 line common battery multiple board for the Peru Telephone Company.

THE TELEPHONE APPLIANCE COMPANY, Minneapolis, Minn., believes that money can be saved by the purchase of the "Yankee" pole seats. It calls attention to the fact that, although the design of these seats is so simple that they can be manufactured and sold at a low cost, their users find that they meet all practical requirements. It is sending full information to telephone companies who wish to be shown the advantages claimed for this material.

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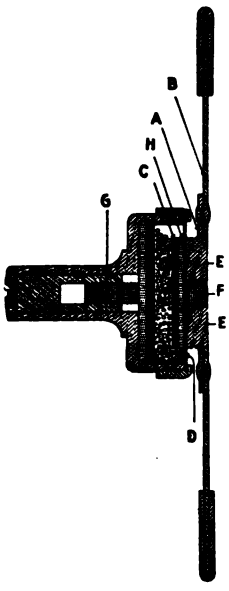
Think of This



The terminal supports of the front electrode, EE and F and A, are of aluminum, having but 1-5th the weight, therefore offer but 1-5th the inertia offered by the brass nuts, screws and lugs, performing the same functions in other transmitters.

With but 1-5th the inertia for the sound waves to overcome, is it not reasonable to suppose that this transmitter is more sensitive and will reproduce the timbre and quality of the voice more accurately than any other? To prove that it does, we will send you one on thirty days' approval, and if not satisfied, you may return it at our expense.

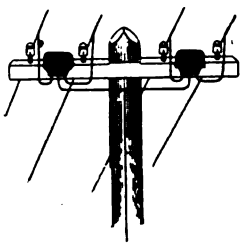
May we send one?

Long Distance Telephone Mfg. Co.

Makers of "Better" Telephones

SOUTH BEND, INDIANA

CHAPMAN LIGHTNING ARRESTERS



Are bridged to the line and offer no retardation to the talking or ringing currents. You talk past them not through them. They cannot be put out of commission by heavy discharges as they contain no metal parts to fuse or melt and ground the line.

Write for sample NOW.

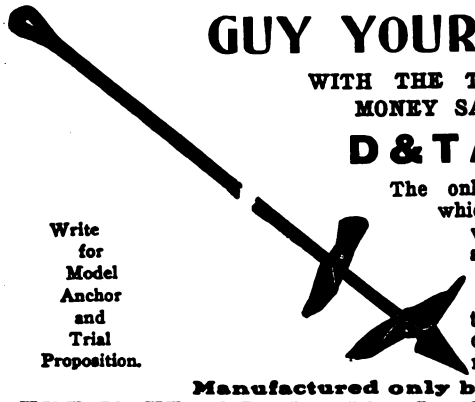
MINNESOTA ELECTRIC CO., Minneapolis, Minn.

H. E. COBB, Selling Agent, 1501 Monadnock Block, Chicago, Ill.

GUY YOUR POLES

WITH THE TIME AND MONEY SAVING

D & T ANCHOR



The only patent anchor which is installed without the aid of special tools.

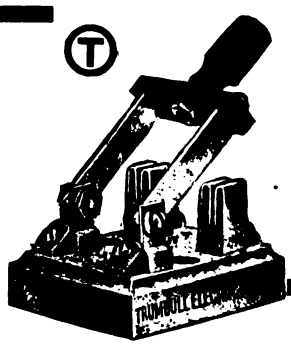
Just drive and twist. Installed by one man in one minute.

Write for Model Anchor and Trial Proposition.

Manufactured only by

THE VOTE-BERGER CO., La Crosse, Wis.

TRUMBULL TELEPHONE SWITCHES



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710	D.P.D.T.	.50	50

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MR. BUSY-MAN

HAS IT

The Easophone Smile

Well, do I like it?
You are a good friend.
I will tell you why.
It is *out of the way.*

The cord *doesn't get mixed up* with my papers and other things on the desk. It doesn't get *knocked off* on the floor. When anyone comes in and wants to use it, he doesn't *disturb the papers* on the desk, or *get in my way.* It takes up *no space* on the *"business end"* of the desk.

I have *one hand free* when talking, *can lean back in my chair,* and *talk with comfort.* No *heavy standard* to hold. No leaning over to the transmitter. Always *ready,* always *talks up,* always *convenient.*

WRITE FOR BULLETINS Nos. 101 AND 102

The Wire & Telephone Co. of America, Rome, N. Y.

Manufacturers of Telephones, Telephone Supplies, Bare Copper and Magnet Wire

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News Notes of Interest

NEW COMPANIES.

COATESVILLE, IND.—Among the newly organized Independent telephone companies is the Coatesville Telephone Exchange Company, of Coatesville, Ind. The company has an authorized capital stock of $1,500, and contemplates the installation of an up-to-date telephone system. Among the incorporators are Jesse Masten, H. T. Bonhannon, S. Hunt, E. S. Messler, S. H. Hunter, D. S. Bowen and F. F. Todd.

GARYSBURG, N. C.—The Farmers' Mutual Telephone Company, of this city, has been incorporated with a capital stock of $2,500. It expects to construct and operate a telephone system between Garysburg and Roanoke Rapids and into the surrounding country. Among the incorporators are W. H. Joyner, J. H. Fitzhugh and others.

BERTHOLD, N. D.—Articles of incorporation have been filed by the Crescent Telephone Company, of Berthold, N. D. It has an authorized capital stock of $10,000 and the incorporators are F. F. Russell, Minot, N. D.; L. V. Gray, Minot, and H. M. Shirley, Berthold.

BRITTIN, N. D.—The Brittin Rural Telephone Company has been incorporated with a capital stock of $3,000 and the following directors elected: Dr. B. F. Stewart and Henry Hosley, of Brittin, and George W. Callett, of Edmond.

PINGREE, N. D.—The Pingree-Foothill Telephone Company, which was organized some time ago, and has already commenced work on its system, has filed articles of incorporation. It has an authorized capital stock of $30,000, and the names of the incorporators are Thomas Price, C. B. Joos, M. H. Kinnean, of Pingree, and others.

TEMPLE, OKLA.—Among the newly organized Independent telephone companies is the Temple, Randlett and Eschiti Telephone Company, of Temple, Oklahoma, which has been organized with the object of building and maintaining a telephone system in Temple and the surrounding country. It has an authorized capital stock of $24,000, and among the incorporators are V. I. Adair, J. W. Adair, Sr., J. W. Adair, Jr., S. L. Adair, W. H. Little and others.

BERWICK, PA.—The Fowlerville Telephone Company has been organized and has already constructed seven miles of line. Its plans cover the construction and maintenance of a telephone system between West Berwick and Orangeville, work upon which is to be commenced at once. The officers of the company are Elisha Ringrose, president; Bruce B. Freas, vice-president; John Scott, secretary; Boyd Freas, treasurer. The above officers, together with George B. Dennis, James Williams and Hiram Brown, constitute the directors of the company.

LITTLE MEADOWS, PA.—Among the newly organized Independent telephone companies is the Little Meadows Telephone and Telegraph Company. The capital stock is placed at $1,000 and the incorporators are A. D. Brown, Little Meadows; G. B. Palmer, Apalachin; G. H. Beebe, South Apalachin.

PARIS, TEXAS.—The Texas-Oklahoma Telephone Company, which is being organized and financed by Paris capital, is the latest Independent telephone enterprise in Texas. The company, which has already constructed six miles of line out of Paris, expects to install a system between Paris and Hugo, thence west along the A. and C. Railroad, through Durant into Sherman, Texas. Going east from Hugo the company intends to extend its lines to Texarkana, Ark. When completed its plant will give service to a considerable number of subscribers.

KENT, WASH.—Articles of incorporation have been filed by the Kent Independent Telephone & Telegraph Company, of this city, which has an authorized capital stock of $20,000, divided into two hundred shares of one hundred dollars each. The charter is to extend for a period of fifty years, and those interested in the new enterprise are A. T. West, J. Howard Snively, C. E. West, Ned Roney, Milo J. Loveless and others.

FRANCHISES.

LA JOLLA, CAL.—A petition has been filed with the city clerk of La Jolla by E. W. Scripps for permission to erect poles and string wires for a private telephone line between La Jolla to a connection with a service already established north of La Jolla running to Miramar.

SILVIS, ILL.—It is the intention of the Union Electric Telephone & Telegraph Company to apply to the city council of Silvis for a franchise to install and operate a telephone system in this city. Application is also to be made to the city council of East Moline. This action has been brought about in Silvis by the solicitations of the citizens on account of the alleged poor service which they are receiving. The Union Electric Telephone & Telegraph Company has the assurance that over one hundred telephones will be installed if it is successful in obtaining its franchise.

LOUISVILLE, KY.—It is quite probable that an ordinance for the sale of a new franchise for the Home Telephone Company may be introduced in this city. This, it is expected, will be practically a duplicate of the former one which expired with the late council, and will give the company the privilege of installing pay stations and party lines. In addition, the clause in the present franchise which fixes a maximum service rate for the company will be changed so that no prices will be named, provision being made instead that the rates charged by the company shall be under the jurisdiction of the General Council.

LIVERMORE FALLS, ME.—Application has been made by the Maine Telephone and Telegraph Company to build additional lines in this city.

MARSHALL, MINN.—An ordinance granting a franchise to M. W. Harden, A. C. Chittenden, J. A. McNiven, C. C. Whitney and A. C. Bowe to install and operate a telephone exchange in Marshall has been passed by the city council. Work is to be commenced at once on a thoroughly up-to-date system.

CAMDEN, N. J.—Permission has been obtained by the Eastern Telephone Company for the further extension of its plant in Camden.

CHEHALIS, WASH.—Application has been made to the city council for a telephone franchise by B. E. Clement, who is connected with the Independent Telephone Company. It is proposed to install a plant at a cost of between $30,000 and $40,000 and construction work is to be commenced at once.

CHARLESTON, W. VA.—The Home Telephone Company has applied to the city council for permission to conduct additional construction work in Charleston.

ELECTIONS.

DURAND, WIS.—The directors of the Inter-County Telephone Company are Philip Fox, Ward Lobdell, Charles Heck, Richard Walters, G. W. Sankey, James Allison and Joseph Bauer.

WINONA, MINN.—The following officers have been elected by the Home Rural Telephone Company, of this city: President, Lloyd Barber, Winona; vice-president, O. S. Bundy, Wilson; secretary and treasurer, J. H. Johnson, Winona.

FINANCIAL.

ATLANTA, GA.—The application of the Atlanta Telephone & Telegraph Company for the issuance of $2,000,000 of bonds, with the amendment that only $1,000,000 shall be issued in bonds at the present time, has been granted by the State Railroad Commission. This money is to be used in the improvement of the company's system.

MISCELLANEOUS.

MISSOURI VALLEY, IA.—The Missouri Valley Telephone Company, formerly the property of L. A. Little, has passed into the hands of the Interstate Telephone Company, which owns and operates lines in the western part of Harrison county. The new owners expect to make many improvements in the newly acquired plant.

HOLLY, MICH.—The Interstate Telephone Company has withdrawn its request for a franchise in Holly, and expects to enter the village under the State law. It is now building a copper line from Saginaw, which will pass just east of Holly.

NEW ULM, MINN.—Arrangements are being made by the New Ulm Rural Telephone Company whereby connections are to be established with the Tri-State Telephone & Telegraph Company for communication with the Twin Cities. This will greatly improve the New Ulm Company's service to its subscribers.

GOUVERNEUR, N. Y.—Plans are under way by a number of Gouverneur capitalists for the installation of an Independent telephone system to be operated in competition with the Bell Company, with whose service the citizens have become dissatisfied.

UTICA, N. Y.—After a consideration of the propositions submitted respectively by the Independent and Bell telephone companies at this city the contract for furnishing telephone service to the public schools was awarded to the Home Telephone Company.

GARYSBURG, N. C.—The capital of the Farmers' Mutual Telephone Company is $25,000 instead of $2,500, and of this amount $9,000 has been subscribed. It expects to build lines from Garysburg to Roanoke Rapids, Pleasant Hill and Vincent's Cross Roads in North Carolina, and to Emporia, Va., and the following is a full list of the incorporators: W. H. Joyner, J. H. Fitzhugh, J. E. Suiter, J. W. Crew, W. T. Carstarphan, W. W. Grant, W. E. Daniel, J. W. Grant, J E. Moody, G. E. Ranson, J. B. Collier, G. W. Massey, John R. Carstarphan and others.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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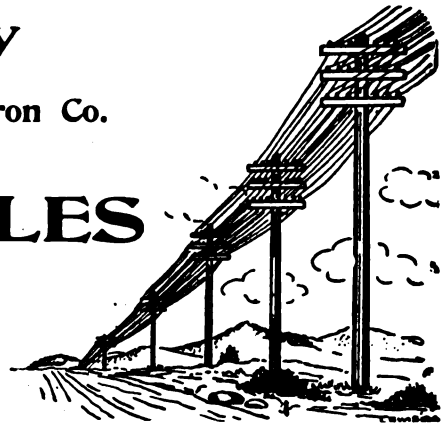
SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from
Maine to Washington



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LONG LEAF YELLOW PINE

All Heart, Special Sizes, Plain Painted
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Quick Shipments.

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WE ALSO HANDLE CHESTNUT AND WESTERN RED CEDAR.

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KANSAS CITY
LOS ANGELES
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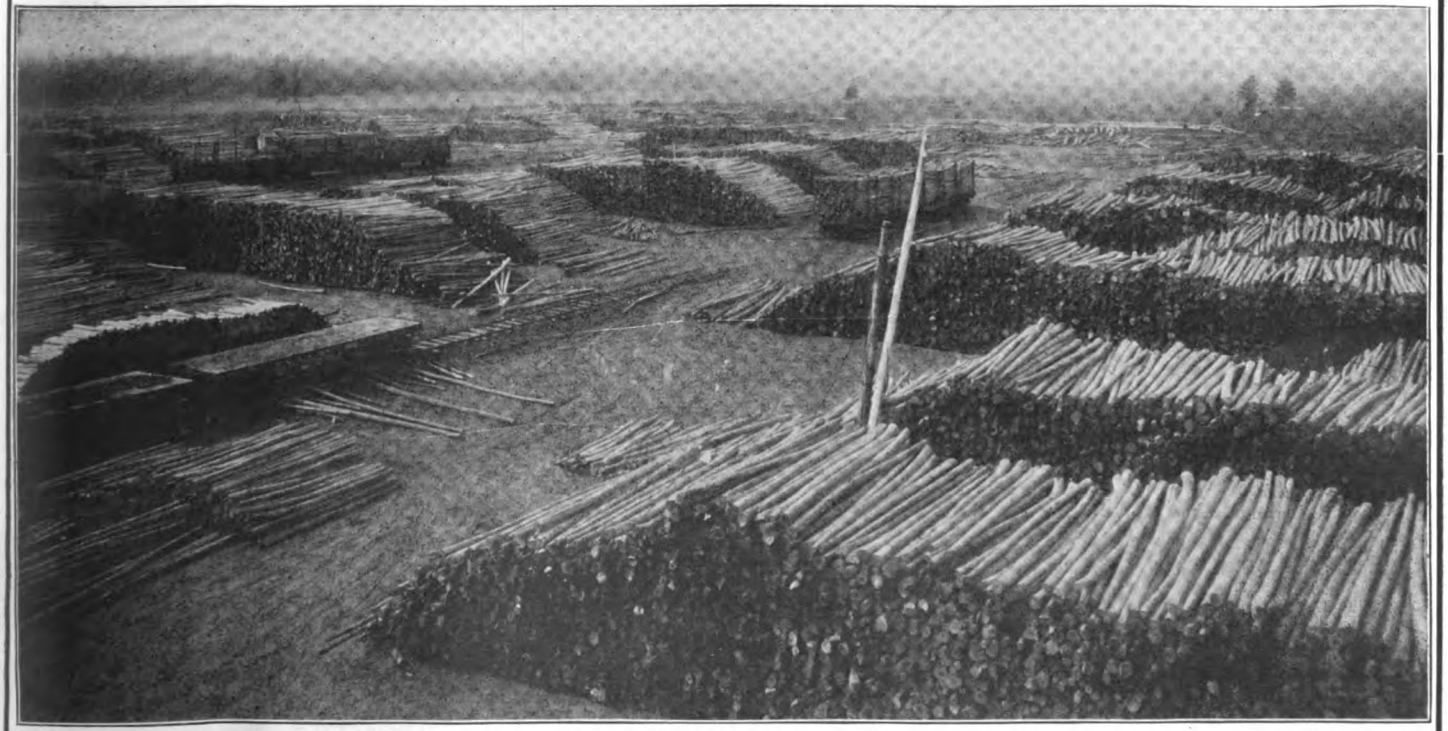

WE ARE NOW NAMING VERY ATTRACTIVE FIGURES.

OUR YARDS AT ESCANABA, MICH. PROMPT SHIPMENTS MADE FROM STOCK.

WRITE FOR DELIVERED PRICES. ADDRESS DEPT. A.

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News Notes of Interest

MANITOU, OKLA.—The incorporators of the recently organized Manitou Telephone Company are H. P. Barton, J. A. Parkinson and S. E. Harper.

MADISONVILLE, WIS.—Owing to the dissatisfaction occasioned by certain rules and regulations governing its telephone service inaugurated by the Cumberland Telephone & Telegraph (Bell) Company, the citizens of Madisonville are considering the advisability of discontinuing its service and organizing a new company to operate in competition.

WINNIPEG, MAN., CAN.—The contract for the building of the conduits in connection with the government telephone system here has been awarded to Stone & Green, Minneapolis, Minn., at a minimum of $83,000, the exact amount of conduits to be constructed not yet having been decided upon.

PERSONAL.

J. R. BAILEY, formerly of Milton, Pa., has been appointed manager of the United Telephone & Telegraph Company's lines in the Shamokin district. This district comprises exchanges at Shamokin, Mt. Carmel, Ashland, Mahanoy City, Shenandoah and Girardville.

C. O. HARRIS, well known to Independent telephone men throughout the country and formerly manager of the plant of the Utah Independent Telephone Company, Salt Lake City, Utah, has recently associated himself with the Fremont Independent Telephone Company, Ltd., St. Anthony, Idaho, and will assist in the work of developing the Independent telephone business in the Southeastern section of that state.

In the Advance

ARKADELPHIA, ARK.—Many improvements are being made by the Arkadelphia Telephone Company in its plant, including the installation of a new switchboard and the rebuilding of a good part of its lines in this city.

LOMPOC, CAL.—A number of new rural lines are being erected by the Home Telephone Company in and about this city.

ATLANTA, GA.—Many extensions in its plant are to be made by the Atlanta Telephone and Telegraph Company.

ATLANTA, IDAHO.—The construction of a telephone line from Atlanta to Twin Springs has been authorized by the Forest Service. Supervisor E. Grandjean, of the Sawtooth National Forest of Idaho, has had $1,550 placed at his disposal for this work. The line is to be fifty miles in length and will connect four of the granger stations which are now being built.

ATWOOD, ILL.—Improvements in its system are being planned by the Atwood Mutual Telephone Company.

DECATUR, ILL.—The Illinois Traction system is installing a duplicate telephone line between Decatur and Springfield. The company expects eventually to have a duplicate system over all its lines, and to install a central station.

PONTIAC, ILL.—A new telephone system is being installed by the Home Telephone Company at Pontiac.

AUBURN, IND.—The Home Telephone Company has just erected a toll line between Fort Wayne and Auburn and also one to Angola. Many other improvements are now under consideration.

BROWNSTOWN, IND.—The Brownstown Independent Telephone Company is building a number of new lines throughout the surrounding country.

FORT WAYNE, IND.—The additional lines planned by the Home Telephone and Telegraph Company, of this city, which has recently built lines to Auburn and Angola, are to extend to Monroeville, Payne, Van Wert and Ossian.

HUNTINGTON, IND.—In the new construction work which the United Telephone Company is planning, it is estimated that about eleven reels of cable, varying in weight from forty-five hundred pounds to one thousand and fifty pounds, will be used.

MEDORA, IND.—A new switchboard has been installed by the Medora Telephone Company and it is now rebuilding all of its city lines and constructing a number of new rural lines.

BOONE, IA.—Within the next six months, so Charles C. Deering, the manager, announces, the Boone County Telephone Company will expend about $50,000 on its system in Boone. It is the company's intention to make its plant one of the best telephone systems in the State. At the present time the company has about 30,000 feet of cable in service and 12,000 feet of underground conduit. It will install new equipment throughout, switchboards, telephones, etc.

INDEPENDENCE, KAS.—Many improvements in its system are being made by the Home Telephone Company in this city.

MESABA, MINN.—It is proposed by the Mesaba Telephone Company to greatly extend and improve its system between the Mesaba range and Duluth and also to make many changes in its local system. The new lines will run to Kelly Lake and thence to Fermoy, by way of the Great Northern Railway cut-off, to Cloquet, Florwood and Brookston. A large amount of money is also to be spent in the betterment of service at Hibbing.

GENEVA, NEB.—Work on the construction of its system has been commenced by the Farmers' Mutual Telephone Company.

UNIVERSITY PLACE, NEB.—Work on the erection of its new exchange building has been commenced by the Independent Telephone Company in this city.

DALTON, N. Y.—Among the improvements planned by the Livingston Rural Telephone Company is the construction of a line from Dalton through White Settlement.

PENN YAN, N. Y.—The plant of the Inter-Ocean Telephone and Telegraph Company at this place is to undergo many improvements.

FAYETTEVILLE, N. C.—A new exchange building is shortly to be built by the Carolina Telephone and Telegraph Company at Fayetteville.

CATASAUQUA, PA.—The Consolidated Telephone Company's plant is undergoing many changes and improvements at this city and a branch exchange for the new Empire Steel and Iron Company's building is also being installed.

HARRISVILLE, PA.—The Harrisville (Pa.) Telephone Company is erecting a new toll and local line from Harrisville to Wesley, Pa.

NEW CASTLE, PA.—A new switchboard, the cost of which is somewhere in the neighborhood of $50,000, is being installed by the American Union Telephone Company. It is also rebuilding its lines in all parts of the city, and expects to make many other improvements in its other plant.

NEW WILMINGTON, PA.—Many improvements in its system have been made by the New Wilmington Telephone Company, and many more are planned for the near future.

VOLANT, PA.—A number of new lines have been erected by the Plain Grove Telephone Company in its territory around Volant, and it is now considering the construction of lines to Mercer and Grove City in the immediate future.

SMILEY, TEXAS.—Among the improvements planned by the Gonzales Telephone Company is the installation of a new switchboard and the stringing of 1,500 feet of cable. The company intends to make its plant in this city thoroughly modern in every particular.

CHESTER, VT.—The White River Telephone Company, which is owned by George Marsh, is building a line between Chester and Houghtonville.

ANACORTES, WASH.—The Farmers' Mutual Telephone Company is now at work on the construction of its new exchange building and the installation of its system in this city.

CHETEK, WIS.—Extensions and improvements in its plant are being considered by the Chetek Telephone Company.

FOND DU LAC, WIS.—A new system is being installed by the Rosendale Telephone Company in this city.

GRANTSBURG, WIS.—The lines of the Farmers' Independent Telephone Company are to be extended to Bass Lake and other points in the near future.

MARSHALL, WIS.—In order to accommodate its increasing number of subscribers the Interurban Telephone Company contemplates the erection of additional lines to Waterloo and is also considering the construction of a line to Deansville.

SARONA, WIS.—Among the extensions planned by the Basham Rural Telephone Company is the erection of a line from Shell Lake to Sarona.

CAYUGA, ONT., CAN.—A local telephone system is being installed by the Erie Telephone Company in this city and connections with the surrounding country are soon to be established. A large number of subscribers have already been secured in Cayuga.

MELITA, MAN., CAN.—The Melita-Arthur Telephone Company, Melita, Man., has installed a thirteen party line in connection with the Melita exchange, and contemplates further extensions in its system.

WINNIPEG, MAN., CAN.—The Manitoba government expects to establish an automatic telephone system in the provincial buildings this fall. The system will include the Parliament buildings, court house, jail, old and new land titles buildings. There will be upward of eighty telephones installed in the various offices connected with the civil service. The central will be in the Parliament buildings, with conduits connecting the other buildings. Address Orrin F. French, superintendent of telephone construction for Manitoba, Winnipeg, Man.

UNDERGROUND.

SAN FRANCISCO, CAL.—An agreement to the effect that all telephone wires shall be placed underground in certain portions of the city has been submitted by City Electrician Hewitt to the committee on public utilities.

CLINTON, IA.—At a recent meeting of the city council an ordinance was introduced requiring that all telephone wires in this city shall be placed underground.

MADISON, WIS.—As rapidly as possible all telephone wires are to be placed underground in this city.

VICTORIA, B. C., CAN.—It is quite probable that the major part of its wires in the business section of the city will be placed underground by the B. C. Telephone Company.

BRANTFORD, ONT., CAN.—The Canadian Machine Telephone Company is at work installing a conduit system in Brantford.

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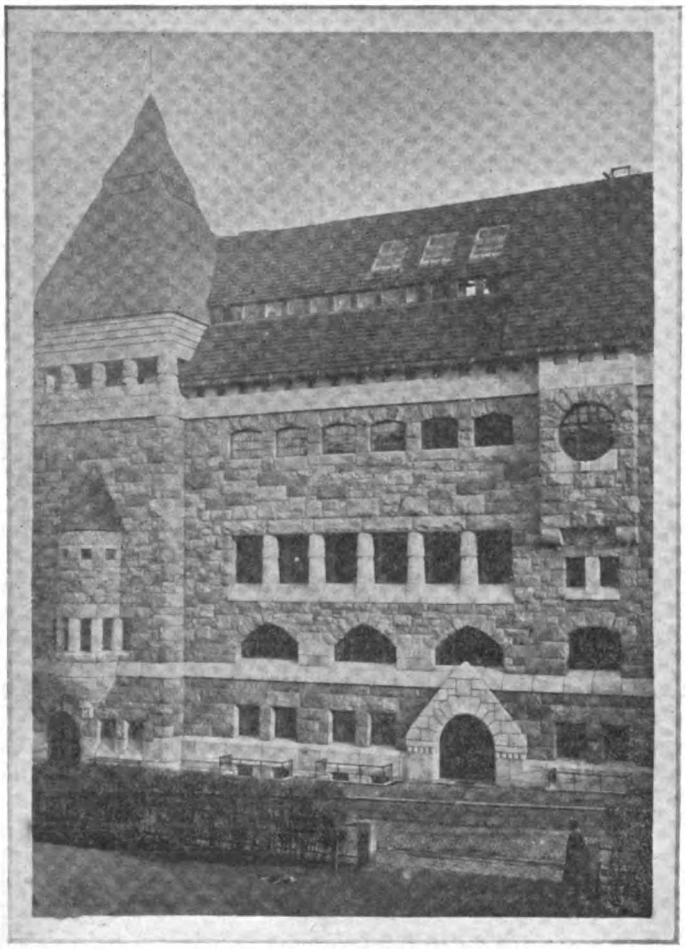
A New Co-operative Telephone Exchange in the Capital of Finland

By Georg Bergh.

HELSINGFORS, the capital of Finland, for a long time previous to the year 1902 received telephone service from a privately owned company. In the estimation of the telephone users, and the people of the city in general, the rates charged under this régime were entirely too high, and it was generally believed that the company was not making as active efforts as it should have made to give the best possible service and extend its system as rapidly as was demanded to make it suit public convenience. The result of this attitude of the public toward the company was the formation of an association bearing the name of the Helsingfors Telephone Association, to which all telephone users should be eligible. This organization, formed in 1902, bought the existing plant of the old company, and continued to give service from it. The avowed object of the Helsingfors Telephone Association, which is a co-operative organization, is to give to its members an up-to-date telephone service at the least possible cost.



Effective Arrangements for Securing Natural Light on the Equipment of the Helsingfors Exchange are Worked Out by Unusual Architectural Methods.

The city of Helsingfors has a population of 120,000, and of this number 6,500 are now telephone subscribers. The co-operative association has found it advisable to provide two rates, one for members and the other for users of the service who are not members of the association. The former pay an entrance fee of $30, buy their own telephones, and pay $12 per annum. Service can be obtained on a subscription basis, without the payment of the entrance fee or the purchase of the instruments, upon the payment of $20 per annum.

The plant of the company now embodies the results of the most advanced studies among European telephone engineers, and is believed to be of a nature to compare favorably with any exchange operating under approximately similar circumstances in the world. Throughout the well built up portions of the town the cables are run underground in multiple duct conduits. At the end of 1906 the association had 6,949 duct-meters of conduit and 82 manholes in its underground plant. All main runs are of 200 pair lead armored cable. Taps for distribution are taken off in units of 50 pairs or less as required.

At the beginning of the present year the new exchange building, which is one of the most important structures in the city, was ready for occupation, and the company moved into it, and has since been using it as its headquarters and central office. Five stories high, the entire floor space is intended either for present or ultimate use of the telephone association in the active prosecution of its work, and it is therefore designed and built especially to meet the requirements of an up-to-date telephone exchange, and provide for the offices of the company. Safety is assured by making the building of brickwork, concrete and iron, with a granite frontage. Very little woodwork is used, so that the risk from fire is small. In the basement is located the main cable room. Ducts in the wall furnish a means of entrance for the cables, which are brought in from the office manhole under the sidewalk. From the point of entrance the cables run in the basement in ducts to the wall of the building, through which they are extended vertically in special conduits to the fourth floor, where they go to the cross-connecting room.

The heating and ventilating plant is also located in the basement and a power plant for lighting and generating current to run the motors for the charging and ringing machines. A bath room, toilets for the outside men and material rooms are also located here.

The first floor of the building is occupied by the maintenance department, a repair and carpenter shop, room with lockers and

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a library for workmen. Space is also provided for the several employes of the company, including foremen and persons working in the building.

The maintenance office is equipped with a modern testing board with different instruments for determining and testing all the troubles likely to occur. Several lines lead from here to the cross-connecting room. All circuits are so arranged that by manipulating keys and reading instruments, ohmmeter, voltmeter, etc., all the required tests for grounds, opens, reverses, shorts and all other trouble not only on the lines and sub-station apparatus, but also in the switchboards, can be made from this desk. All troubles are announced or reported here; they will be at once tested and noted on trouble tickets. If the trouble is on the exchange they are delivered to the wire chief there, or if on the subscriber's instrument to the mechanicians who take care of them, or to the outside troublemen. Each multiple board is equipped with a separate plug with automatic signals for connecting troublemen to this office directly.

On the second floor of the building are located the business offices, the offices of the engineering department, of the general manager, and of the board of directors. These offices are all finished in modern style with high grade furniture and fittings. Large storerooms are also located on this floor.

The third floor is occupied by the operators' locker room. One hundred and twenty lockers for the use of operators are placed here in a large, well lighted hall. Provision for some of the engineers, bath rooms for operators and for other employes, and toilets are also located here, this floor, as will be seen, being wholly set aside for the use of employes in such a way as to make the conditions under which they work as healthful and agreeable as possible.

(To be continued.)

MILWAUKEE TELEPHONE SUBSCRIBERS HAVE FOWARDED COMPLAINTS CONCERNING POOR BELL SERVICE TO STATE RAILROAD COMMISSION.

PROMINENT business and professional men of Milwaukee have banded together in an effort to secure better service from the Wisconsin (Bell) Telephone Company. The petition which was forwarded to the Commission alleges the following specific faults in operating:

"Frequent and unreasonable delays in obtaining responses from operator.

"Repeated connection with numbers other than those called for.

"Repeated connection with exchanges other than the one called for.

"Operator's stereotyped answer 'line busy,' when in truth and in fact the line or number called for is disengaged and connection therewith might have been readily made.

"Operator's patent answer 'line busy' or 'they can't answer,' when in truth and in fact the line or number called for had been out of service for weeks, and in some instances months.

"Frequent ringing of subscribers' bells by mistake, when not wanted, coupled with operator's 'number?', and 'there is no one on your line, we'll call you again.'

"The incessant changing of 'phone numbers and line letters after the publication of the periodical directory, thereby creating confusion, annoyance and unwarranted delays.

"Failure on the part of the company to indicate on operators' switch board changing of numbers and line letters made after publication of directory, thereby necessitating an interview with one or more chief operators.

"Utter disregard and indifference of chief operators, officers and officials to subscribers' complaints about service.

"Neglect of company for days, weeks and often months to repair 'phones and lines out of commission.

"Numerous inexcusable interruptions and discrimination while 'phones are in use.

"Assignment to each operator of a number of lines or 'phones far in excess of her capability."

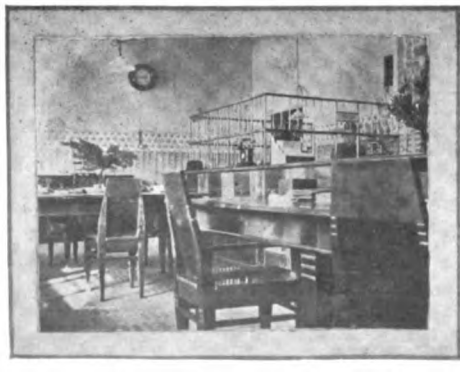
The petition further states that the operating is, according to the belief of the petitioners, defective because the low scale of wages offered to its operators offers no inducement to any other than young, inexperienced and untrained help.

MICHIGAN INDEPENDENT TELEPHONE COMPANIES RAISE NIGHT RATES.

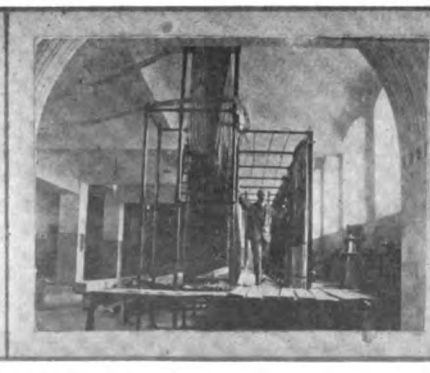
THE Citizens' Telephone Company of Grand Rapids, Mich., in conjunction with other Independent companies in the State, has at last decided to abolish the special reduced night rate. Night rates to points outside of the State were discontinued some time ago, and this later action is said to apply to points within the State. This decision was made at a meeting of the traffic committee of the Independent companies, held last week in Detroit. In Michigan the effect of this change will not make very much alteration in either the revenues of the company or the cost of its service to its patrons, as under the former system the night rate did not apply to messages which under the day rate would cost 25 cents or less. As more than 90 per cent. of the toll business is reported to come within this classification the small effect of the change will be evident. The company by this change puts its rates on the same basis as those of the new Long Distance Company of Indianapolis, and the U. S. Long Distance of Cleveland, which have recently raised their night rates to the same figures charged during regular business hours.

BURGLARY IN A NEW ROLE.

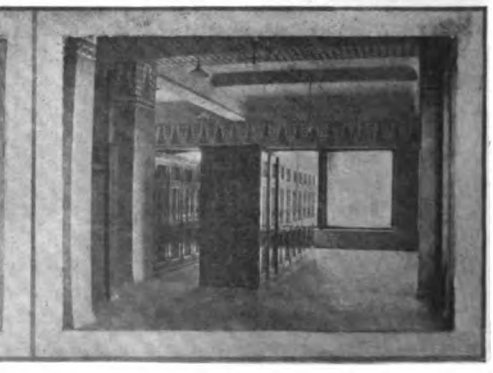
MRS. W. A. IPES, of Indianapolis, was airing her house a few days ago when the telephone bell rang. She left the windows up and went to the telephone to find that a stranger was at the other end. His words she could not understand, although he held her attention for some time, not aware of what was going on behind her. Finally becoming disgusted with the rambling conversation she hung up the receiver. She turned and saw going out the window a man who, it seems, was a burglar, and, of course, he has not returned the valuables that are missing. The burglars' fraternity has sprung a new fad, as the man who called over the telephone was undoubtedly a confederate whose part was to keep the occupant of the house engaged until the robbery could be effected.



Section of the Cashier's Office, Showing Substantial Furniture.



Main Distributing Frame, Photographed During Installation.



View of a Portion of Locker Room in the Helsingfors Exchange.

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The Maintenance of Toll Lines and Operation of Composite Circuits*

By N. C. Kissell.

An interesting trouble is that of a line crossed with a foreign circuit which is perfectly clear. This will make the telephone line very noisy, and gives nothing to work on with a bridge. This trouble is one of the kind which has to be run down by means of a listening test, the section in which the trouble exists being located by testing with the test stations. Fig. 12 shows the conditions to be found in a line crossed with a foreign wire. When the lineman calls in for a test he is ordered to cross out the pair. Then the test board men at each end listen in on the circuit. Whichever end is quiet, the trouble is the other way from that end. Supposing the line is crossed out as shown by the dotted line at *a*. Then the line will be perfectly quiet from there to *a* and noisy to *r*, because no matter what the conditions on the line are between this cross and *b*, any disturbing currents caused by this foreign wire unbalancing the circuit will divide at this short circuit, and will be of the same strength in each line wire between *a* and the cross, neutralizing each other and therefore making it quiet to *a*. This condition is not found with *b*, as the disturbing wire will cause unequal potentials to exist between the two line wires causing currents to flow through *b*. If the cross were placed at the dotted line *b*, the circuit would be quiet to *b* and noisy to *a*. If the cross were placed at *c*, the circuit would be quiet to both *a* and *b*, as the disturbing currents would flow equally over the line wires in the same direction in both, one current neutralizing the effect of the other. By this means a lineman can be intelligently worked up to his trouble, when the wire chief has nothing but the ear to determine which way to send him. This test can be resorted to for any noises from any cause.

In case of an unbalanced line the circuit can be listened upon as the lineman is worked to his trouble, on account of the noise created on a circuit by reason of the unbalance. Many other tests could be described which are applicable to special troubles. The rule holds good with respect to all that the ability to locate toll line troubles correctly lies in the thorough understanding of the Wheatstone bridge and Varley loop test, because of the great flexibility it affords to the man who is acquainted with its workings.

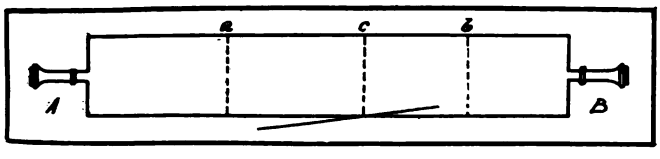

Fig. 12. Diagram showing conditions existing when telephone line is crossed with foreign wire which does not carry current, and method of making crosses to aid in locating the trouble by listening tests.

The computing of the distance in miles from ohms resistance is not always so simple a process as it might appear to be at first thought. A safe way to obtain results is to take the average resistance per mile at the time the test is made. A map showing the distance in miles of the circuits is on the test board, or should be, as without it one finds it hard to comprehend how any trouble could be located. The map may show that a certain circuit is 100 miles long, and made up of No. 12 N. B. S. copper. This wire has a resistance of 5 ohms to the mile at a certain temperature. This would make the 100-mile circuit measure, on a loop, 1,000 ohms at a given temperature. Upon making a loop measurement to locate a trouble the wire chief might find that the loop resistance was 920 ohms. This would indicate that the wire at this time did not measure 5 ohms to the mile and there would be a small error for every mile of wire, so that if the trouble were a considerable distance from the testing end, these errors would be added together for each mile and make in the aggregate a rather large error. The best and safest thing to work on is, therefore, the average resistance of the wire. This is shown by a definite example for the circuit 100 miles long, assuming that at the time measurements are being made for a trouble, it gives a loop resistance of 920 ohms and the trouble is 310 ohms from the office. Then, dividing 920 by 100 gives an average loop resistance per mile of wire of 9.2 ohms, and the trouble is 310÷9.2=33.7 miles from the testing end, not 310÷10=31 miles from the testing end, as would be indicated by the use of normal resistance values. This in a way corrects for the difference in the resistance of the wire under different temperatures.

On lines that are loaded, that is where Pupin loading coils are placed in the circuit, the latter will introduce a certain error in computing ohmic resistance into miles of wire. The loading coils are simply inductance coils, or coils of wire wound on an iron core, whose purpose is to pull the talking current waves into phase with the E. M. F. which impels them, these having been displaced by the capacity of the line. The coils are placed in a waterproof iron case, and mounted on the cross arm between the line wires into which they are to be introduced, and are protected by lightning arresters of a special type, which are also mounted on the arm. The two coils for each line are placed in the case, and the line wires are cut at this point, and passed through the coils. The ohmic resistance of each coil is 1.25 ohms, and a pair is introduced in the circuit every eight miles at an "S" transposition. These coils, therefore, introduce this extra resistance in the line wires and should be considered in all calculations to obtain close results.

A No. 8 N. B. S. wire, commonly used on "long haul" circuits, has a resistance of about 2 ohms per mile, or 4 ohms per loop mile, which will be 16 ohms every eight miles, or 32 ohms for an eight mile loop. With the load coils introduced the resistance would be 17.25 ohms every eight miles, or 34.50 ohms loop resistance. If the line is in trouble and locates at a 500-ohm loop, it will be seen that in this case there will be a good deal of coil resistance introduced. If the coils were not in the circuit and the trouble measured 500 ohms from the testing end (loop), it would be distant 500÷4=125 miles. Now, in 125 miles there would be 125÷8=15 coils introduced, or an aggregate resistance of 37.50 ohms, which would be equivalent to 9.4 miles of wire which are not actually in the circuit.

By taking a loop measurement of the whole circuit at the time of the trouble, and knowing the length in miles of the circuit, the average resistance per mile with the load coil introduced can be computed, and excellent results obtained. For instance, supposing the circuit of No. 8 N. B. S. wire is 200 miles long and loaded. In this circuit there will then be 25 coils, or a coil resistance of 62.5 ohms. On taking a loop measurement of this circuit 862.5 ohms is obtained independent of any cable resistance. Then the circuit will average 4.3 ohms, loop, per mile, and if the trouble is 500 ohms distant it will be 500÷4.3=116 miles, instead of 500÷4=125 miles, a difference of 9 miles. The farther the trouble is from the testing end, the greater the error introduced by these coils, on account of the greater number inserted. This taking of the average resistance per loop mile of wire holds true because the extra resistance introduced is evenly distributed over the entire line. If the extra resistance were all at one point, as in a long cable for instance, this average would not hold true, as the resistance is not evenly distributed. This method has been followed by the writer, and thoroughly tried out, with the result that he has been able to locate troubles where others missed by 10 and 15 miles.

*Continued from the issue of Oct. 12.

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In the simplex circuit, as both wires are used for the "Morse" current, the wire surface exposed to the weather for a given distance is doubled. For example, if there were 40 poles to the mile, there would be 40 very high resistance leaks through the insulators to ground in wet weather, and all of these would be in multiple. Using the simplex, there would be 80 leaks in multiple to ground. In fact, although the resistance of a line of 100 miles will be as 50 miles, the leakage

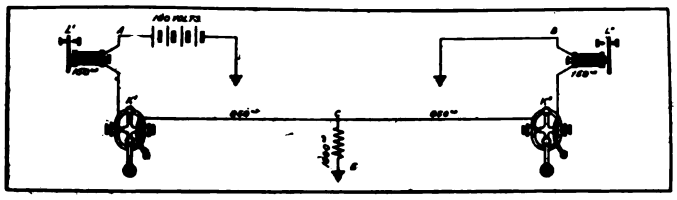

Fig. 13. Diagram to illustrate example showing effect of line leakage on operation of telegraph instruments.

will be as for 200 miles. This leakage in wet weather is the greatest factor in determining the distance over which "Morse" can be operated on the simplex circuit, on account of the working margin of the ordinary "Morse" relay. It is mainly for this reason that battery must be placed at both ends of the circuit for successful operation, so as to give a good margin; also to keep the drop of potential in the wires equal for different weather conditions at different points along the route. To illustrate, referring to Fig. 13, let A C B represent a telegraph wire having a resistance of 2,000 ohms, including instruments, with a battery of 100 volts placed at one end of the line only. If there is no leakage, the current which flows upon closing both keys K' and K" is 100/2000 ampere, or 50 milliamperes. and this current is the same in both relays. Now, let there be a leak of say 1,000 ohms resistance connected from line to earth at its middle point. Upon closing both keys the current in L' near the battery becomes 66 2-3 milliamperes and that in relay L" at the distant end of the line is only 33 1-3 milliamperes; the current flowing to ground through the leak being also 33 1-3. If the distant key K" is opened, the current in L" falls from 33 1-3 to zero; but that in L' falls from 66 2-3 to 50 milliamperes. On the other hand, if the key K', nearer the battery, is the only one opened, the current falls from 33 1-3 to 0 in the distant relay L" and from 66 2-3 to 0 in the relay K'. That is to say, the key K', nearer the battery, will always operate all the relays for any working adjustment; but the relay L' nearer to the battery must be carefully adjusted to receive signals from the distant key K", which is sending a message toward the battery, because the current is only changed from 66 2-3 to 50 in relay L' by the operation of key K". The instruments can be adjusted more easily if the battery is divided into two sections of 50 volts each, one connected at each end of the wire, which should be done in practice, and commonly is done for the reasons stated. Assuming this to be done in the case illustrated, the currents which flow when both keys are closed will be 50 milliamperes in each relay and no current through the leak, C E. If the key K" only is opened, the current in L" falls from 50 to 0; but in L' from 50 to 25. The change of the working current in this relay is now 50 per cent.; where in the previous example it was only 25 per cent., so that a working adjustment is more easily obtained. Although the foregoing example assumes the leakage to be at one point of the wire, which is seldom the case in practice, yet it illustrates the effect of leakage as well as if it were uniformly distributed. If it were uniformly distributed, the current on the wire would gradually diminish from a large value near the battery end to a small value at the distant end, passing through all the intermediate values. In this condition, for the reasons stated, it is difficult to send a message toward the battery by opening and closing the wire at the distant end. As the simplex is liable to introduce an excessive leakage, one must place the battery at each end of the line, and it is desirable to cut down the working current to as small a figure as possible, just giving enough for a good working margin.

As is well known, telegraph circuits cannot be worked for great distances, as from New York to New Orleans for example, without the use of repeaters. The telephone circuits are divided into two classes, "long hauls" and "short hauls." By short hauls are meant circuits up to say 500 miles, and long hauls anything greater up to the limit of transmission. The long haul wires are of No. 8 N. B. S. wire, which is about the size of No. 6 B. & S. These long haul circuits are never used for "Morse" circuits, on account of reaching the limits of transmission, and the losses introduced by the repeating coils and composite apparatus. A long distance telephone message must always pass through several central offices between the terminals, thereby cutting down the loss in transmission by distortion and attenuation due to cables, switchboard wiring and cord circuits. To make these losses a minimum, lines are cut into as few offices as possible, and this also removes the possibility of too many operators being across the line. As these wires are not used for "Morse" the latter would be divided up into a number of comparatively short circuits, connected together with repeaters to form a long line. Several short telegraph circuits, each circuit repeating into the other by the action of the repeater, and each circuit having its own battery, are thus established. Supposing such a typical circuit were composited from end to end between sections, as shown in Fig. 14, which shows only one side, leaving out the telephone part. Take such a case as is found when *a* attempts to send to *h*. Upon closing the key, current passing to the first repeater, station *b*, will suffer a delay on account of the condensers and impedance coils in the circuit, as described in the article on composite circuit. It requires a fraction of time to overcome this effect, and the signal will be received at *b* a fraction of time later than the instant the key was closed. The signal received at *b* is passed to *c* by the action of the repeater, the effect of which is similar to the operator at *a* being suddenly transferred to *b*. The signal at *c* will be received a fraction of time later than at *b* on account of the coils and condensers in this section. When *c* repeats to *d* the signal is received a little later there than at *c*, and so on all along the line. The speed of a good "Morse" operator is about six makes and breaks of the key per second, or the length of time the current will be sent to line will be .16 second. As the current is delayed all along the line, it will not flow through the receiving end at *h* for this length of time before the key is opened. Say the key is held down for .16 second, and the delay in the whole line caused by its time constant is .05 second, then the current will flow through the relay at *h* for .05 second and the armature would hardly have

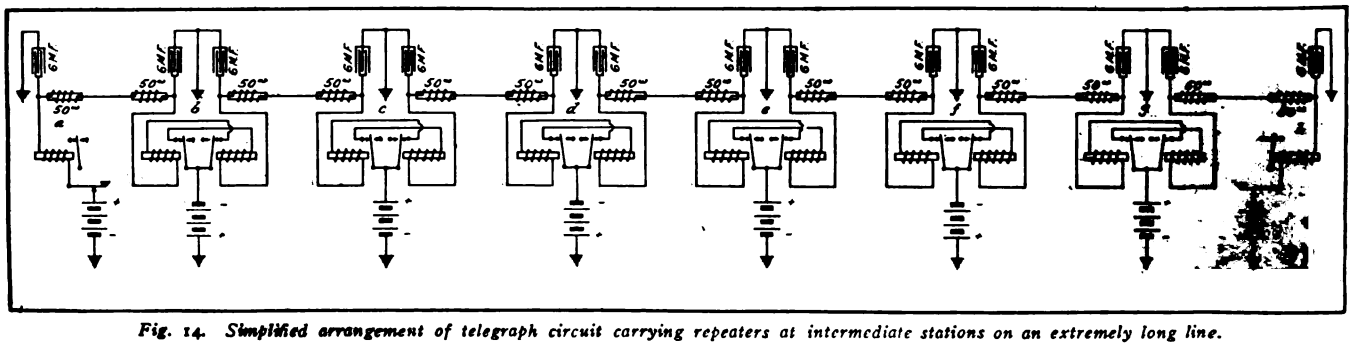

Fig. 14. Simplified arrangement of telegraph circuit carrying repeaters at intermediate stations on an extremely long line.

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time to draw up before the current is stopped. The shape of the "Morse" wave being so altered, any combination of signals made would be unintelligible. The effect is similar to that obtained if *a* should attempt to send through a large amount of cable. From this it is clear that composite circuits have their limit as to the length over which they can be operated for telegraphic purposes. The circuit described would work better simplexed. Although the simplex offers a greater leakage in wet weather, the effect of this is local between divisions, and each section has its own battery at both ends, and messages are repeated from section to section. In practice, however, a lease of this length will be worked straight, that is, one of the telephone circuits would be sacrificed to make a single wire with repeaters. The wire would be worked as a single wire during the leased wire hours and then put back into a telephone line.

It is impossible to operate any high speed telegraphy, such as the "Wheatstone," on a composite. Here a speed of 300 to 400 words is attained, and this very rapid make and break will partake of the properties of alternating current. The impedance coils in series with the line wires have a detrimental effect on the signals coming at such a rapid rate. It could be worked very efficiently on the simplex plan, as here the high inductance and capacity are done away with. From this then it appears that the simplex circuit can be operated any place the composite can, but the composite cannot be worked any place the simplex can, the latter giving more flexibility.

(*To be concluded.*)

Determining Rates for Large Telephone Exchanges*

By W. H. Crumb.

THE object of this paper is to point out some of the many questions which must be given careful consideration in order to properly establish equitable rates for large telephone exchanges. It makes no pretence of suggesting what the particular rates should be, as such a determination is only possible after a careful consideration of all of the questions mentioned for any particular case to which they may be applied. Much of the information, and particularly the charts and curves, were included in a report made by a special commission composed of Prof. Dugald C. Jackson, Dr. George W. Wilder and the writer, selected by the City of Chicago to investigate matters pertaining to the telephone situation in that city.

The art of communicating by telephone is one of the most useful economic agencies devised by man, and the development of which imposes a great duty upon any who undertakes the furnishing of telephone service; therefore, it is the duty of any firm or corporation organized for the purpose of furnishing telephone service in any community, and especially in a large city, to thoroughly develop the field in which it operates and supply good telephone service at reasonable rates. This duty involves a problem in many respects more complex than that of any other public utility corporation. This complexity is partially caused by the personal element of the telephone user, partially by the relatively large number of classes of service which the telephone company must offer to its patrons for the purpose of fully developing its service, and partially by the intangible character of

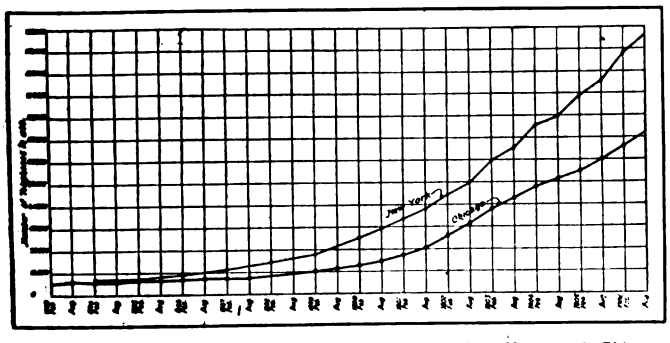

Chart 1. Growth curves for telephone systems in New York and Chicago.

the electric medium over which the telephone business is carried on, the delicacy of the apparatus used and the wide difference in the manner and extent of the use of the apparatus by the various subscribers.

Telephone service contemplates the furnishing of facilities and setting up of electrical connections so that a person from any subscriber's station may communicate with or receive communications from a person at any other subscriber's station which may be connected to the system. The successful and satisfactory accomplishment of this depends upon many manual, mechanical and electrical operations, over some of which the telephone company has no control.

The demand for telephone service is very extensive and varied, and the company supplying it must be prepared to take care of the requirements of a range of patrons as wide as the range of the city itself, including the largest business organizations, hotels, newspapers, professional men, small business houses and residences of all classes. It must provide apparatus for the service of each class of patrons which will enable it to furnish service to each subscriber at an appropriate price within his means. It is desirable that the prices be graded so that the large user shall not pay less than his fair share of the expense for maintaining the telephone and remunerate the company for its investment; and equally so that the small user may get his service at a price which is within his means and yet is reasonably remunerative to the company for its outlay. The great problem which confronts all telephone companies of to-day is that of supplying a good quality of telephone service to the small user at a price which he can afford to pay and still leave a fair margin of profit to the company.

It must be assumed that any organization engaged in supplying telephone service has entered into that business with the primary object of a profitable investment for capital, and rates must be fixed and charges made with this point always in view. No company engaged in such a beneficial undertaking as this should be wrongly guided or compelled either of itself or through legislative regulation to adopt or put into force rates which will not insure a reasonable profit, for by so doing the development of this great and useful industry will be seriously retarded, and its benefits denied to those to whom they are entitled.

In order to give the best possible telephone service the following features must be maintained at the highest possible standard:

The telephone plant should be engineered and constructed along broad lines, with ample facilities for handling the business and taking care of future growth, and should at all times be well maintained in first-class working order.

There should be provided suitable means for quickly and accurately connecting and disconnecting subscribers' lines, also for signalling the subscriber desired without the knowledge of any other subscriber.

All lines should be free from inductive disturbances and of sufficient carrying capacity to provide for a high standard of transmission.

The speech transmitting and receiving devices should be of the best quality and carefully maintained.

The number of cut-offs which interrupt communication, the number of busy reports and other unavailing calls, and all interferences with conversations between subscribers should be reduced to a minimum.

*Abstract from a paper read at a meeting of the Western Society of Engineers, Chicago.

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The work required of subscribers should be reduced to a minimum.

All of the plant employed in producing service should be under the control of one corporation or organization.

The company furnishing service should provide courteous treatment to all of its subscribers, and should promptly and fully follow up and satisfactorily adjust all complaints.

An accurate directory of subscribers' telephone numbers should be provided.

There are two general methods which have been adopted by telephone companies of charging for telephone service, namely, the flat rate method and the measured service method.

The term flat rate ordinarily means the manner of charging for service which consists of a fixed price per year for furnishing the subscriber with a telephone instrument in his place of business or residence and a suitable line or lines and means of connecting, so that he may converse with other subscribers at will. This method is a survival of the idea that the telephone company rents apparatus and telephone lines, and is based upon the theory that the cost of providing service to any subscriber to a particular class of service will be very nearly equal to the average cost in that class of service. When flat rates are charged the telephone subscribers are ordinarily divided into two classes of service, business subscribers and residence subscribers. These classes may be sub-divided by placing 2, 3, 4 or more subscribers upon a party line. These sub-divisions are made on the basis of differences in the amount of equipment required for each subscriber. All subscribers to flat rat service are authorized to make as frequent use of the telephone as their requirements or convenience warrants, and all subscribers to the same class of service are presumed to pay the same price. The warrant for this equality in price charged subscribers who may make use of their telephones in widely different degrees lies only in an assumption that the expense of the service is almost altogether a matter of providing lines and apparatus, and that the cost of providing each subscriber's service is practically the same for all subscribers in that particular class. The greatest range of rates that it is possible to make with a flat rate arrangement is relatively small. The difference between the highest paying flat rate subscriber and the lowest paying flat rate subscriber being relatively small tends to retard telephone development and prevent the general use of the service. Assuming that the total receipts of the telephone company operating under flat rates are sufficient to pay the cost of operating and maintaining the service, and produce a reasonable profit on the investment, it is evident on account of the very unequal use of the service by the different subscribers that the small users manifestly pay more than their service requires, while the large users, who keep their telephones constantly busy, receive a service of much greater value to themselves, given at a greater expense to the company than is justified by the annual amount which they pay. The large use of flat rate lines from which many calls are made interferes with the traffic of the small users by keeping their lines so busy that the small users are unable to conveniently get into communication with them, thus causing unavailing calls which are expensive to the company and annoying to the subscribers.

The term measured rate service ordinarily means service which is carried on upon the assumption that the telephone company is organized for the purpose of *giving telephone service*, as distinguished from the renting of instruments. It is, of course, obvious that the company must furnish its subscribers with suitable telephone instruments and lines, and also provide the necessary equipment for making connections between subscribers' lines, which is made purely for the purpose of enabling subscribers to transmit messages between each other with the greatest practicable convenience and dispatch. It is the business of the telephone company to provide the means for the transmission of messages, and measured rates go upon the assumption that the telephone company should be paid for the performance of this specific service. Since it is necessary for the company to go to considerable expense to provide the subscriber with facilities for the transmisson of messages, it is appropriate for the company making measured rate charges to exact a guarantee that there shall not be less than a fixed minimum number of messages, or that the rate paid shall not fall below a certain reasonable amount per annum. This amount usually includes the transmisson of messages up to an appropriate number, over and above which an additional charge may properly be made per message. The ideal method of charging for telephone service is obviously to charge the subscriber in proportion to the service which he receives, and to make the charges to all subscribers as low as is consistent with the operation and maintenance of the property and the payment of a fair return on the money invested. The measured rate arrangement manifestly makes it possible to reduce prices to the small telephone user to the smallest possible annual charge; that is, to a charge which is just sufficient to cover a reasonable interest and depreciation for the portion of the plant that must be set aside for the individual user (or the average of the users of his particular class) increased by an amount which is proportional to the actual number of messages transmitted from his telephone in a year. It is only by this arrangement that large city service may be extended to small business men and small residence and apartment dwellers, whose demand for service may not warrant them in paying more than $18.00 to $24.00 per year, and this sort of subscriber constitutes a remarkable proportion of the total telephone using population of a large city.

In all other lines of business where articles or service are sold, the selling price of each article or class of service is based upon the cost of producing the particular article or the class of service rendered. It is true that in some cases these items of cost are based upon averages, but they are usually determined from detailed knowledge in such a way that where averages are used cost prices are arrived at with considerably accuracy. Strange as it may seem, telephone companies have made no successful efforts to arrive at the detailed costs of furnishing the different classes of service, and the problems relating to each class of service and the proper charges for different classes of service have not been worked out in a suitable manner. The telephone companies apparently have been so fully engaged in the extension of their business and the extension and improvement of their plants that they have not found men or time to work out the details of operating economies and the best methods of handling service of different classes of subscribers in the way railroads, traction companies, electric light companies and various other public utility corporations have been working out the details of economy relating to the processes in such manner as to afford appropriate data for fixing rates, and in every instance telephone rates seem to have been dictated by estimates based upon experience or the requirements of business expediency instead of being founded on a knowledge of the cost of producing different classes of service. Telephone companies seem to go on the belief that their business is satisfactory if the total receipts of a year's business show a profit, and they have heretofore apparently neglected to consider more than superficially the essential question of whether the rates charged dealt fairly by the different classes of subscribers. It is an unfortunate condition in the telephone business that the telephone instrument should be generally adopted as the unit upon which telephone rates are based instead of the telephone message, the instrument being provided simply to enable the subscriber to transmit messages.

In order to determine the proper rates to charge for different classes of service it is necessary to first ascertain the cost of producing each class of service. The cost of production is made up of five principal items, as follows: (1) Plant investment. (2) Operating expenses. (3) Maintenance expenses. (4) General expenses. (5) Depreciation of plant investment.

The object of constructing a telephone plant is to provide facilities for furnishing telephone service, and it must be assumed that when a plant is constructed it is to be built with the idea of fully developing the telephone business in its particular locality, and in order to do this it is necessary to construct the plant in such a manner that various classes of service may be furnished in order to fully meet the requirements of the

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various classes of telephone users. A telephone plant in a large city usually consists of a group of central offices, each one of which is connected to all the others by a system of trunk lines and radiating from each are the lines extending to the various subscribers' premises. Each central office is provided with suitable switchboards, so that connections between subscribers' lines can be quickly made. The amount of capital necessary to invest in the construction of a telephone exchange necessarily depends largely upon the local conditions and also upon the requirements which may be placed upon the company by city regulations. Some of the principal features which go to determine cost of construction are as follows: Number and location of central offices. Price of real estate. Average length of subscribers' lines. Character of public improvements. Municipal requirements. Traffic requirements. Provisions for growth and development of the business.

It is the object of the telephone engineer in designing a telephone system to so plan the plant that it may be constructed in the most economical manner to fully meet the present and future telephone requirements of the locality in which it is built. One of the first and most important matters to be given consideration is the number and location of central offices. It is impracticable with our present method of manual telephone operation to connect more than ten to twelve thousand subscribers' lines to a single multiple switchboard, so that the maximum grouping of subscribers' lines on one board is thus limited to that number. It is possible, however, to group two or more switchboards on the same premises, so that centers of distribution for an unlimited number of subscribers may be located at will. The most economical location of central offices is that which will provide for the shortest average length of subscribers' line and still limit the number of central offices so that the percentage of trunk calls will be reduced to a minimum and the investment in trunking plant likewise reduced to a minimum. The price of real estate has much to do with determining the location of central offices, and usually is a very considerable factor in the construction cost of all large exchanges. Character of public improvements, principally that of street paving, is responsible for a great deal of the expense of constructing telephone plants, as in all large cities considerable amounts of underground conduits have to be installed, and it is of course much more expensive to lay these in paved streets than in unpaved ones. Municipal requirements also influence construction costs considerably, the principal requirement being that which compels telephone companies to place all wires within certain localities in underground conduits, and also those which make it necessary for a company to replace portions of its aerial plant with underground conduits and cables. The small telephone user may be provided with ample facilities for handling his telephone traffic by means of a party line, whereby several subscribers may be connected to the same line, the number being directly dependent upon the in and out traffic of the total number of subscribers connected to the line. The subscriber of larger use requires a single line, and this is graded up to the largest user with a private branch exchange and several trunk lines, all of which are directly in proportion to the amount of traffic which the telephone user has.

It would indeed be a simple problem for the telephone engineer to design an economical telephone plant for any given number of subscribers whose locations were known and would remain permanent, but the telephone business is developing and extending at such a remarkably rapid rate that it is necessary in designing a telephone plant to look far into the future in order that the work done now may become an economical part of the plant years in advance. The history of the telephone business has been so short that no well defined laws of development have been arrived at. Yet experience teaches that past estimates of future development have been very much underestimated and that in the future we have reason to look forward to even greater development than that of the past. Less than fifteen years ago there was no telephone exchange system with as many as 10,000 subscribers served by the system; at that time the number of telephones in Chicago was considerably under 10,000. Only seven years ago there were less than 25,000 telephones in Chicago, and at about that time the present tremendous rate of growth in the number of telephones began. The average increase during the last five years has been at the rate of approximately 20,000 per year. A similar increase in the growth of the number of telephones began in New York City a couple of years earlier.

Chart No. 1 shows growth and number of telephones in use in Chicago and New York from 1893 to August, 1906. This rapid growth demands a large idle investment in plant cost, as in most cases it is more economical and in others absolutely necessary to make plant additions in large units to provide facilities which remain idle until the growth of the plant has made their use necessary when a large additional investment must be made.

(To be continued.)

BELL COMPANY FAILED TO GET HOME TELEPHONE COMPANY, OF JAMESTOWN, N. Y.

BUSINESS transactions of much importance to the citizens of Jamestown, New York, have just been consummated by a number of leading citizens of that city in securing control of the Home Telephone Company.

The Home Telephone Company was formerly controlled by the United States Independent Telephone Company, of Rochester, whose stock the Bell organization endeavored to secure several months ago.

Unwilling to run any risk of telephone competition being eliminated in their city, a number of leading citizens of Jamestown determined to secure, if possible, a majority of the stock of the Home Telephone Company. The efforts of these citizens have been rewarded with success, and the transfer of stock has been completed. It is now in the hands of Arthur C. Wade, William J. Maddox and General Manager John H. Wright, the leaders in the movement, together with other well-known men of the city and vicinity, among whom are the following: Edward L. Hall, George V. Blackstone, Supervisor A. B. Sheldon of Sherman, M. H. Clark, John Galloway, Albert Gilbert, Judge Arthur B. Ottaway of Westfield, Frank E. Gifford, Charles H. Gifford, Dr. William M. Bemus and D. E. Merrill of Jamestown.

Local papers, commenting on the situation, say:

"The stock of the company has been placed in the hands of three trustees, Brewer D. Phillips, M. R. Stevenson and Charles W. Herrick. This action has been taken to prevent the control of the corporation from passing into other hands. It insures competition in telephone service in Jamestown, and with a corporation controlled by local citizens it is safe to assume that better service will be provided for the patrons of the company."

EFFECT OF MOISTURE ON WOOD.

THE Forest Service has just issued a publication entitled "The Strength of Wood as Influenced by Moisture," in which are shown the strength of representative woods in all the degrees of moisture from the green state to absolute dryness and the effects of resoaking. This publication will be sent free to those interested upon application to the Forest Service, U. S. Department of Agriculture, Washington, D. C.

INITIATIVE AND REFERENDUM LAW TO BE CONSTRUED.

SUIT recently instituted by the State of Oregon against the Pacific Telephone Company to compel the company to pay a state tax of 2 per cent. on its gross earnings for the year 1906 is resisted by the latter in an answer filed recently, the grounds being that the initiative and referendum by which the tax law was put in existence is unconstitutional. Briefly the company contends that under the initiative and referendum law the electors of the state are enabled to usurp the legislative functions of the state and national government in direct violation of the federal and state constitutions, which provide that congress and the legislature shall be the sole legislative bodies.

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With the Editor

GETTING DIVIDENDS ON INSTRUCTIONS.

EVERY single contribution that a supervising official of a telephone company can make to the efficiency of his staff has a direct bearing on the success of the entire organization. In an ideal organization the different steps in accomplishing a given piece of work would be taken up and completed in a regular order, each man engaged upon the work having in his possession simple, definite instructions which afford him all necessary information, thus obviating all back references. In so far as instructions which tend to make this possible are issued, they become an important factor in the reduction of the operating expenses of the company which receives the direct benefit, and so are important contributions to its prosperity. They are just as satisfactory dividend producers as a method of generating electricity direct from coal, and offer a great deal more practical opportunity for the exercise of inventive faculties.

In working out forms for such instructions it seems to be a good thing to begin right at the ground and work upward. When a mechanical designer sets to work upon a new problem the very first thing he does is to get firmly fixed in his mind the result which he must produce. Then he considers the force he must employ, and when this is settled he is in a good position to work out a method of guiding this force, so that its application shall be steady, smooth and, above all, effective. In a broader sense the same principles assist the organization of human efforts. The object is to utilize to the utmost the natural and acquired energy of men.

The superior knowledge of an able chief is never best applied by direct transmission through the members of his staff. In an organization based upon this principle—and telephone men may see not a few of them if they will but look around—there are always evidences of a real loss between each step and its successor. Contrasted with this idea is the more successful plan which makes it possible to guide the efforts of each man, so that he applies skilfully all his mental and manual attainments to the work in hand, without undue effort at any point. Practically, such a plan consists in indicating clearly the successive results to be obtained, so that each man may know just where he is to begin and in what condition he must leave things when his part of the task is completed.

It is in adapting a routine form of instructions to the ability of the men who are to carry them out that the superintendent's skill is shown. He must know the force which is at his command. It would not do to have one set of instructions for John, who is all ready to step into the foreman's job; nor would it be a good plan for the chief to go so far into detail as would be necessary if the work were to be handed over to John's helper, who has been in the business three months. The better plan is to take a fair average, and then get the men in line and train the individuals in details until each man is able to follow the scheme. With a fair plan issued, each man knows what he has to work for, can see a definite object before him, and will hustle to fit himself for what he has to do.

An interesting complication in the issuing of instructions to telephone men arises as a result of the necessary division of work among departments. Their relation to one another and to the work to be done always has to be carefully considered. Useful suggestions along the line of efficiency in adapting routine instructions to such conditions were offered in the article by Mr. Barnes, published last week. The idea he described was intended to make it possible for all departments concerned to follow a job from start to finish by the use of duplicates of a single form, which served at once as an outline of what was to be done and a progressive record of completion.

Making his own work easier is always an object which the man in charge hopes to obtain by issuing instructions. He wants to take up a job and pass it along in such shape that his first instructions may come pretty near to being the final word. After he has started a job he wants to be able to give his time to the next thing at hand, and hear no more about the first work until he gets a notification that the desired results have been obtained. Freedom from interruptions enables him to keep at the work of making plans, for which he is hired. He can only achieve this by definiteness and completeness in the essential points of his instructions. Here is where the men can co-operate with the boss by getting together and cleaning things up as they go along. It is impossible to devise a perfect routine in advance, but when a group of men have been working together for a long time if the boss has to watch everyone all the time it shows a serious lack of efficiency all along the line. The best way to eliminate this sort of friction is to get up a set of instructions that provide for a definite standard routine on each separate class of work.

WHEN THE TROUBLEMEN GET INTO THE GAME.

TWO troublemen have given the editor quite a lot of pleasure this week by sending in for examination articles covering features of the work they are doing. They had some good ideas, which is nothing new; but the point is that they realized that these ideas were worth something to other men, and that they had the ability to think them out clearly enough so that they could put them on paper in words that would tell what they wanted to say. It would be a good thing for every troubleman if he would realize that such a possibility is open to him, and try to develop his abilities along this line.

It seems to be hard for the average man who goes out to clear up lines to break away from the idea that the work he does has no special value as a means of fitting himself for more important duties. Because he has a lot to learn about the way the company is run he hesitates to make his own job a stepping stone toward the acquisition of the knowledge which he would so much like to possess. He is not as a rule slow to seek methods of improving his efficiency as a trouble hunter, but does not look about for ways to become an all-round telephone man.

We venture to say that as soon as a trouble hunter gets where he begins to know good work from bad he is ready to make rapid progress if he has ordinary ability. His advancement then depends on three things—his ability to ask the two great questions, "What?" and "Why?"—his ability to get answers to his questions—and finally, the extent to which he can remember the answers he obtains. There is not a day goes by that does not open up a dozen opportunities along this line. For example, a ground is due to the abrasion of the covering of an insulated wire. Your average man tapes it up or cuts in a new piece and goes on to the next job with nothing said. Suppose he should take a brace and find out what the covering of this wire is made of, how rapidly it deteriorates in the open air, the effect of moisture and wear and tear. This leads on to a consideration of wires in general, and the comparative first costs and maintenance expense per year of each type. A troubleman would not have to follow this line of inquiry up very far to get to a point where he could tell the general manager a few things that it would be worth his while to know.

Now it is one thing to get information and another to make it useful. Facts are of no use by themselves. It is only when grouped in their proper relation to one another that they acquire a value. The man who starts out to learn the telephone business must realize that the information he gets must be classified, and kept ready for concentration when its use is demanded by a new problem. Probably the most effective way to use it will be to give it to somebody else, and this introduces a new demand upon a man's ability. He must know how to tell things. Ideas must be put into words, sentences, and groups of sentences before they can pass into another man's mind. When a troubleman gets so he can tell any other man just how a single trouble shows, how to locate in the shortest time its cause, and how to repair it in the best way, he has taken a good step toward making himself a superintendent of maintenance.

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Telephone Law

CONDUCTED BY A. H. McMILLAN.

HIGH TENSION WIRES MUST NOT BE STRUNG ON TELEPHONE POLES UNLESS COMPANY CONSENTS.

AT Fort Wayne, Ind., the superior court has decided against the city in its suit to temporarily restrain the Home Telephone Company from interfering with the city's purpose to use the top cross arms of the company's poles on which to string electric light wires. The city's plan, looking to the building of a municipal lighting plant, included the use of company's poles for high-tension wires close to the low-tension telephone wires, under the clause in the franchise giving the city the right to string wires for police or fire alarm purposes.

The court found that the troublesome words in the franchise were "the city free of cost to use for its police patrol system and any other purpose the upper cross arms of any and all poles." It was not contended by either party that the words "any other purpose" could be literally construed so as to give the city a right to make such a use as would be destructive to the proper use of the poles by the company in its telephone system.

The court held that the city had the right to use the upper arms in question and place thereon its electric lighting wires, provided the wire is not of a weight and character, or the current of electricity to be transmitted thereby is not of a voltage or power, inconsistent with the proper construction and operation of the telephone system.

The company, said the court, in the execution of its contract would be required to construct and erect poles and put thereon cross arms of a kind, character and manner, reasonably fit for this privilege and with a proper regard for the right of the city to use the upper cross arms for purposes reasonably consistent with such a telephone plant and its proper operation.

The city contended that its proposed use of the upper cross arms would not injure a telephone plant, or, if it did, it would be the company's fault in not having properly constructed its poles. The company replied that its poles were properly constructed, but that the stringing of electric light wires thereon as proposed by the city would injure its plant. The question as to which party was right the court refused to decide until the final hearing of the case, the recent decision being merely upon an application for a temporary injunction.

SIX HUNDRED OFFENSES ALLEGED AGAINST ONE COMPANY.

ALLEGING 600 offenses in violation of the anti-trust laws of Arkansas, the district attorney at Hot Springs has brought suits against the Southern Telephone and Telegraph Company for penalties aggregating $3,000,000. Prior to May, 1905, the Southwestern Telephone and Telegraph Company was the only one in the field, but shortly afterwards the Southern corporation was organized for the purpose of competition and established a plant at Hot Springs. The state alleges that by means of this "pretended competition" the new company acquired several thousand new contracts and shortly afterwards sold out to the Southwestern. It is alleged that it was a ruse to defeat the law against trusts.

STRIKING LINEMEN PERMANENTLY ENJOINED.

IN the United States district court at Wheeling, W. Va., the attorneys for the defendants in the cases of the National Telephone Company vs. the striking linemen and the Central District & Printing Telegraph Company (the Bell) vs. their striking employees withdrew from the case, announcing that their clients had no desire to enter a defense. The court after hearing the testimony of W. C. Handlan, manager of the National, and M. R. Wolfe, district manager of the Bell, to the effect that there had been a number of depredations committed against the property of the two concerns by persons unknown, made the temporary injunction perpetual, announcing at the same time that if the parties who had cut the wires could be identified, the court would sentence them to six months' imprisonment in some other jail than that of Ohio county.

NO ANTI-FREE SERVICE LAW IN ILLINOIS.

Will you kindly advise me through the legal columns of the AMERICAN TELEPHONE JOURNAL if there is a law in Illinois which prohibits telephone companies from furnishing railroads telephone service gratis?

The railroads throughout the small towns in Illinois decline to pay for service, and the local companies are forced to furnish service without charge. C. F. S.

UNFORTUNATELY for your purpose, we know of no law in Illinois which prohibits telephone companies from furnishing telephone service to railway companies free of charge.

CONSOLIDATION OF COMPANIES IN TEXAS.

There is a rumor here of the consolidation of the Bell Telephone Company and the Independent company near here. We understand that the Bell Telephone Company has made overtures to the other concern looking to the buying of the plant and franchises of the latter company.

Will you please tell us whether such a consolidation would be legal and if not what would be the proper measures to stop it? F. Z.

SUCH a consolidation as you have in mind is positively prohibited by the Anti-trust law of Texas, passed by the legislature in 1903. That law is still in force, and by its terms any merger or combination of two companies or a sale by either to the other would result in the forfeiture of the franchise of both and the dissolution of both corporations. This results whether one company has control of the other directly or indirectly, the law being so broad as not to permit any subterfuge.

The remedy to prevent such a consolidation would be an action of quo warranto by the attorney general of the State or injunction by any stockholder or person interested in either company; a third party cannot interfere.

COMPANY'S DUTY TO LINEMAN OF ANOTHER COMPANY.

A TELEPHONE company which had no knowledge that a workman of another company was to go on its lines owed him no duty to provide a reasonably safe place for him to work and cannot be held liable for negligence resulting in his death. Beeler vs. Louisville Home Telephone Co., 101 S. W. 397.

COMPANY IN EMBARRASSING SITUATION.

A short time ago we had a subscriber known as the People's Furnishing Company. Their name appeared in our directory in this way. The company was a partnership consisting of two persons. One of these persons bought out the other. The contract for the telephone was signed by S., and now we are informed that the firm has dissolved. S. orders us to move his telephone to another address, and to list it in the book as the number of the People's Furnishing Company. The other partner claims to have bought S. out, and says he has no right to use the number of the company. We have been notified by the partner not to give S. the old number under penalty of damages, while S. threatens us with a lawsuit in case we do not comply with his request. What are we to do? F. E. N.

YOU certainly are in an embarrassing situation, and must satisfy yourself to the best of your ability from the statements made and your own observation as to which of the former partners is in the right. If you have not already installed the telephone according to the directions given by S., you might threaten to do so, and thus induce the other partner to secure an injunction restraining your action. This will bring the matter to a focus, and put it in such shape that it will have to be settled in Court by the two partners. You can answer alleging your ignorance of what to do. This course will not be without expense, but the expense will be much less than if you lay yourself open to an action of damages by either party.

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News from Operating Centres

TELEPHONE COMPANY AT FT. WAYNE, IND., WINS FIRST DECISION PREVENTING STRINGING OF HIGH TENSION WIRES ON ITS POLES.

JUDGE HEATON of the Superior Court of Ft. Wayne, Ind., has rendered an interesting decision involving the right of a city to string high current or disturbing wires on telephone poles under reservation. In this case the city of Ft. Wayne attempted to string municipal light wires on the top cross-arms of the Home Telephone Company's poles and the latter removed them. Thereupon the city sought to restrain the telephone company from interfering with the city's purpose to use the company's poles on which to string electric light wires.

The city's plan of building a municipal light plant included use of the company's poles for high-tension wires close to the low-tension telephone wires, under the clause in the franchise which reserved to the city the right to string wires for police or fire alarm purposes. The court held that the provision in the franchise granted to the telephone company reserved no right to the city to string wires of a dangerous or disturbing character for conveyance of an incandescent current.

The decision is received with delight by telephone men throughout the State, since similar conditions exist elsewhere.

BELL RAISE OF RATES BRINGS RUSH OF BUSINESS TO NEW YORK STATE INDEPENDENT COMPANY.

ONEONTA, N. Y., is the latest place of moderate size to be disturbed by a raise in telephone rates. Considerable increases have been announced by the Bell company; and, as a result, everybody is anxious to have his telephone taken out as soon as possible. Fortunately, there is an Independent company on hand, and it is making every effort to take care of the business which is being urged upon it. In one day it is reported to have made 258 contracts, each new instrument which it is to install representing one belonging to the Bell company which will be taken out.

COMPETITION CALLS BELL BLUFF AT LEAVING MIDDLESBORO, KY., RATHER THAN PAY FOR FRANCHISE.

FOR ten years past the East Tennessee Telephone Company (Bell), an organization controlled by the Cumberland company, has been operating in Middlesboro without a franchise. The city council insisted that it should purchase one, and when it refused to do so, ordered it to vacate the city by October 1. On August 10 the city offered for sale a franchise to operate a telephone plant in Middlesboro, and it was purchased by A. C. Chandler, of London, Ky., head of the Independent telephone companies of London and Pineville, and his associates, among whom are several prominent local capitalists. The Middlesboro Home Telephone Company has been organized, and material already purchased for the exchange, under this franchise.

The East Tennessee Telephone Company refused to purchase another franchise unless the city council would grant terms of the company's own making. Such action was, of course, refused, and the company immediately closed its plant, an operation which has been successful in bringing subscribers to terms in a number of other places where there was no competition. The people of Middlesboro, however, are apparently of an entirely different calibre from those encountered previously, and they at once appointed a receiver to operate the plant. When he entered the exchange to take charge he found that the wires and cables had been cut by the telephone officials, and that he could not operate it. Not at all dismayed he immediately got together a force of electricians, and patched things up so that he could make connections over the Bell plant until the new company should be ready to open its exchange. When the lines were cut business men were much annoyed by the prospect of having to do without telephone service until the new company should be operating.

The latest reports are that the prospect of vigorous opposition has brought the Bell company completely to terms. It is now said to be willing not only to restore the service, but promises that it will give better service for the remainder of its stay in the city if the receiver is discharged. It is rumored that the company has found an old franchise, which it claims was issued in 1891, and hopes to be able to continue to operate its exchange under the provisions of this grant.

LONG DISTANCE BELL COMPANY MUST PAY CORPORATION TAX IN TENNESSEE.

ATTORNEY-GENERAL GATES, of Tennessee, has rendered an opinion holding that the American Telephone Company was subject to the State corporation tax of $150 placed by the late legislature on all corporations doing business in the State. The company contended that it was not doing business in the meaning of the statute although its charter had been filed and it had wires running into Nashville. The Attorney-General also held that the mere fact that the only messages sent over the company's lines were interstate would not exempt the company from the tax in question. It is understood that the company will not abide the holding of the Attorney-General, but will take the matter through the courts.

DATES FOR DISTRICT MEETINGS IN NOVEMBER AND DECEMBER DETERMINED BY OHIO ASSOCIATION EXECUTIVE COMMITTEE.

MEMBERS of the Executive Committee of the Independent Telephone Association of Ohio, at a recent meeting, set the following dates and places for the district meetings:

District No. 1, Cleveland, November 8; No. 2, Canton, November 19; No. 3, Zanesville, November 20; No. 4, Newark, November 21; No. 5, Washington C. H., November 22; No. 6, Toledo, December 3; No. 7, Lima, December 4; No. 8, Dayton, December 5; No. 9, Hamilton, December 6.

At these district conventions officers will be elected and delegates will be chosen to atttend the convention of the International Independent Telephone Association, to be held at Chicago during the coming month of January. The overtures of the Bell company to Independent telephone companies in various parts of the State formed a subject for consideration, but it was reported that it was not thought necessary to take any definite action at the present time.

CURTAILMENT OF FREE COUNTY SERVICE CONTINUES TO EXCITE CUMBERLAND SUBSCRIBERS.

DISSATISFACTION over a recent order of the Cumberland Telephone and Telegraph Company has created a great deal of trouble in many portions of its territory. It seems that in many places subscribers were given free service over the entire county over their own telephones. The privilege was abused, according to the company's statement, outsiders being allowed to talk without paying the toll charges exacted from them. As a means of doing away with this practice, the company put into effect an order requiring all persons talking over any other instrument that the one on their own premises to pay a fee of 10 cents per message, this fee being the same as that collected from non-subscribers. The result of this order has been to create a strong sentiment against the company, and much talk of opposition by organizing independent companies. There is considerable talk of this kind in Hopkins County at the present time, and similar reports from other parts of Kentucky are being heard.

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FOR SALE—All copper telephone plant, 100 miles from Cleveland; rapidly growing county seat; 40 per cent. investment, if taken IMMEDIATELY. Good reasons. BE QUICK. Address Box 948, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 948

FOR SALE—200 magneto telephones. Have changed system to common battery, therefore must sell these telephones at once very cheap. Oswego Co. Independent Telephone Co., Fulton, N. Y. 949

FOR SALE.—Telephone exchange and from 100 to 200 miles long distance line in Missouri, making good money; for sale at a bargain. Full particulars and satisfactory reason for wishing to sell on application. Address Box 932, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 932

FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

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For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

CABLE SPLICER wants position. Several years' experience in Telephone, Telegraph and Power Work. Best of references. South or West U. S. preferred. State wages, etc. Address Box 942, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 942

WANTED—Position. Thirty-three years of age, with 4 years' technical training; 7 years' practical experience, from hole digging to Long Distance Construction, Exchange Installation and Management. Address Box 943, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 943

WANTED—Position as manager in large town. Thoroughly experienced in all branches. Now managing up-to-date common battery exchange. Good reasons for changing. Age 27; married, temperate; good references. Address Box 944, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 944

WANTED—$5,000, 5 to 10 years' time, 6 per cent. interest. Interest payable annually or semi-annually. Security gilt-edge. Address Box 945, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 945

WANTED—Position by competent young man as manager or superintendent of telephone exchange, not over eight hundred subscribers. Six years' experience. Good habits; best reference furnished. Address, Box 946, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 946

CAN place one or two cable splicers. $3.50. Will be permanent to competent party. Write fully. Address Box 947, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 947

LIVE, hustling superintendent of company operating three counties desires managership of plant up to two thousand lines. Ten years' experience in every detail, executive and construction. Will guarantee to produce new business and lower outstanding collections. Position accepted on trial to prove ability. Thirty days' notice required. Locality no objection, but prefer North or Southeast. Address Box 940, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 940

POSITION wanted by married man with fourteen years' experience on local battery and construction work. Want steady employment after Jan. 1st as troubleman or manager. References given. Address Lock No. 30, Wilton Junction, Iowa. 941

WANTED—Chief operator for central energy plant of 5,000 subscribers. Must be able to handle operators and understand switch room work. Good salary to proper party. Address Box 935, care AMERICAN TELEPHONE JOURNAL, New York. 935

CASH paid for telephone photographs.—Telephone engineer wishes to secure photographs of standard and new methods of open wire line and aerial cable construction, conduit laying, manhole building, etc. Will pay 75 cents each for acceptable "solio" prints. Address, Box 902, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 902

WANTED.—Two or three good telephone men for troublemen or managers of magneto exchanges of 100 to 300 subscribers. Wages $30 to $50 per month. State experience and give reference. S. H. Young, Sparta, Tenn. 934

ENGINEER who can lay out and superintend the construction of underground and aerial, telephone systems for permanent economy is desirous of making change. High class propositions only will be considered. Address Box 937, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 937

Do you want the best wire to be obtained for Telephone Service?

Use Roebling Hard Drawn Copper Wire

Do you want a cheaper wire which will last for years and give good service on lines of ordinary length?

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News from Operating Centres

INDIANAPOLIS LONG DISTANCE COMPANY BRINGS SUIT TO ENFORCE CONNECTION CONTRACT.

A BIG legal battle is involved in a suit filed in the Superior Court of Indianapolis by the New Long Distance Telephone Company during the past week against the Citizens Telephone Company of Kokomo and the Central Union Telephone Company of Indianapolis, seeking to restrain by injunction the Citizens Telephone Company of Kokomo from giving any of its long distance toll line business to the Central Union Telephone Company and to compel the former to comply with a contract entered into with the New Long Distance Company to turn all of its toll line business over to it during the life of the Citizens Company's franchise.

The complaint sets forth the exclusive contract entered into by the Citizens company with the New Long Distance Telephone Company and alleges that the contract was faithfully observed until October, 1906, at which time the Citizens company entered into an alliance with the Central Union Telephone Company and has from that time to the present given the Central Union Telephone Company at least one-half of the toll line business originating on its system, to the detriment and damage of the complaining company. The purpose of the suit is to enforce the exclusive contract, prevent the affiliation of the Citizens and the Central Union companies and recover the damages sustained by reason of the breach of the contract.

The contract between the New Long Distance and the Citizens company is similar to the contracts existing between the New Long Distance Company and many other Independent companies in the state. Some of these contracts, it is stated, have been violated. The contract sued on was executed May 30, 1900, and was to continue during the life of the Citizens company's charter.

The suit is based upon a charge that the Central Union Telephone Company conspired illegally to bring about a violation of a contract between the Citizens company and the New Long Distance Company and asks for an order prohibiting the further operation of an arrangement by which the Central Union Telephone Company has succeeded the New Telephone Company in handling a portion of the Citizens' toll line business. It is charged in the complaint that by reason of the violation of the contract the business originating with the Kokomo company was cut down from $800 to $225 a month. The complaint alleges that the plaintiff has no remedy at law other than by injunction.

The suit has aroused much interest, since it is regarded as the first step toward the final battle for supremacy between the Independent and the Bell long distance systems.

An Example of Effective Pay Station Advertising. Proximity to Railway Station is a Strong Point.

FORT SMITH, ARKANSAS, CITIZENS KICKING HARD AGAINST BELL SERVICE.

AT a recent mass meeting of the citizens of Fort Smith, Ark., many complaints were made in relation to the service given at that place by the Southwestern Telegraph & Telephone Company (Bell). A resolution declaring that the company has been a trespasser and a nuisance in Fort Smith since February, 1895, and that it was time the nuisance was abated, was adopted and presented to the City Council.

Action on this resolution by the Council is expected at an early date.

STRIKING LINEMEN TIE UP THE BUSINESS OF HELENA, MONTANA.

BECAUSE of a long drawn-out strike against the Rocky Mountain Bell Telephone Company the Helena Trades and Labor Assembly decided a few days ago to order a general strike in all places where the telephones of the Bell company are installed. This action on the part of the unions follows the refusal of a large number of the business men of Helena to stop using telephones until the telephone company has settled the difficulties with its employees. This general order will have an important effect, if carried out rigidly, on the business of the city, as it will apply to every business in which the Bell telephone is used.

TELEPHONE SIGNAL SERVICE FOR BOATS ON THE ST. LAWRENCE.

FURTHER developments in the use of the telephone as an aid to navigation have recently been worked out on a practical basis in connection with boats plying the St. Lawrence River between Quebec and Montreal.

Stations have been erected along the shore of the river, located short distances apart, and are all connected by telephone with one another, and also with the long distance lines extending between the two cities. At each station a mast sixty-five feet in height, with a cross spar of twenty-five feet, has been erected and a signal system, employing the use of flag signals during the day and lights for the night service, will be used for communicating with the river boats in transit.

This system will enable the owners and agents of the boats on the river to know of the progress of the boats at any time, and also to warn the boats of new conditions on the river, so that they may avoid any unusual or unexpected danger. A feature of the system which will be appreciated by residents of Quebec is that the present disturbance arising from the practice of whistling repeatedly for a pilot will be stopped.

RATE REGULATING ORDINANCE PASSED BY CITY COUNCIL AT MADISONVILLE, KY.

THE City Council of Madisonville, Ky., has passed an ordinance regulating the price of telephone service in that city, placing the rate at $1.00 per month for residence and $2.00 for business service. The Cumberland Telegraph & Telephone Company (Bell) has been notified that it must either accept these terms or pay an annual tax of $5,000.

HOW TO FIGURE THE VOLUME OF A TELEPHONE POLE.

A QUICK way to find the approximate volume of a pole is to multiply the area of the circle at the center of gravity by the length of the pole. This disregards any difference there may be in the specific gravity of the wood at the butt and at the top of the pole and assumes that there is an equal volume on either side of the center of gravity, which is practically true in the case of cedar and chestnut poles. The method is much more accurate than that which takes the product of the length multiplied by one-half of the sum of the areas of butt and top circles. This method is given in a recent bulletin of the U. S. Forest service.

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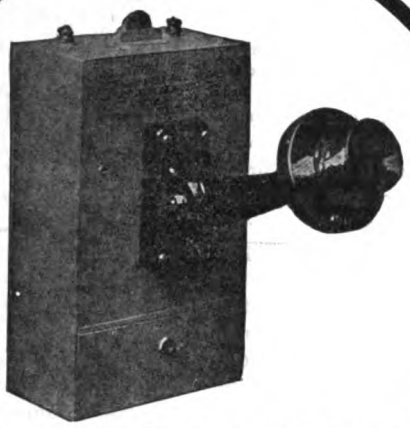

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Service cannot be other than perfect. No fussy features embodied in the construction to engender trouble.

The construction and operation are simplicity itself.

Perfect Service Always

Get our booklet for Further Facts.
Write to-day.

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EFFECTS MAY OCCUR ON TELEPHONE LINES

They are:

1. Gradual Static Accumulations.
2. Sudden Static Induction Due to Cloud Lightning.
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5. High Potential Surges of Steep Wave Front.

Just how your lines and instruments are protected from these five effects of lightning by

SKY ROCKET ARRESTERS

will be shown in this spot in successive issues. Effect No. 1 will be taken up next week and we will also explain why Sky Rocket Arresters

ALWAYS PROTECT

Write for sample to-day and

WATCH THIS SPACE NEXT WEEK

CHANCE MFG. CO. CENTRALIA, MO.

AJAX—THEN AND NOW

NOT "NOW AND THEN" BUT "AJAX ALWAYS"

THEN—

Ajax, the strong, bold warrior, after the duel between Hector and Patroclus, stands defending the body of Patroclus. Jove enveloped the face of heaven with a dark cloud, the thunders roared and lightning flashed. Ajax, looking for a messenger to send and tell Achilles of his friend's death, exclaimed in those famous words of Cowper:

"Father of heaven and earth deliver thou
Achaia's host from darkness; clear the skies;
Give day; and since thy sovereign will is such,
Destruction with it; but, oh, give us day."

Jupiter heard the prayer and dispersed the clouds.

This Cut on All Genuine Ajax-Cells.

NOW—

There is something in a name. It does not make the article better, but it establishes a standard and in our Ajax Dry Battery is suggestive immediately of high strength, recuperative power, long life. All batteries are not alike. Because a battery is advertised to you in your every mail it is not better. You are paying for all that advertising. All quality in the Ajax, not one cent for the name. The battery on which we are willing to put our name, furnish with our Telephones and recommend to telephone exchanges. You want something better than the ordinary "Supply house" battery. You do not want to pay a fancy, factory-made price. Try a barrel under our special offer now, 15½ cents each in barrel lots, especially attractive yearly contracts. Order through our nearest office.

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Answers to Practical Questions

WHY SHOULD A SUBSCRIBER PAY FOR MOVING TELEPHONE?—(929.)

We should like to have some reasons to place before our subscribers as to why they should bear the expense of moving a telephone from one address to another, and also on inside removals. This is a source of much argument on the part of subscribers as they don't feel that they should bear this expense. An answer to the above through your columns will be greatly appreciated. F. H. B., Penna.

The Editor will be pleased to hear from those of our readers who have good reasons to advance to argumentive subscribers on this phase of telephone operation.

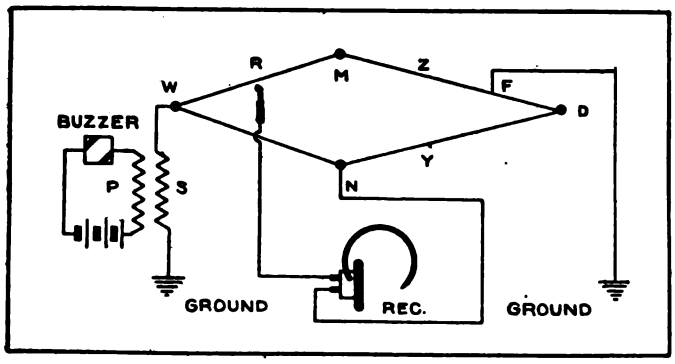

Fig. 930a.

Good arguments will be published in the columns of THE AMERICAN TELEPHONE JOURNAL in the order of their receipt, and paid for.

VARLEY LOOP TEST ON OHMMETER.—(930.)

In using ohmmeter described in AMERICAN TELEPHONE JOURNAL issue of June 1, 1907, kindly inform me as to method of making Varley test, for a ground, using a good wire for one side of the loop.

How would ohmmeter, made as shown in Figure 930*b*, work out? A. E. E., Indiana.

To apply the Varley loop test to a grounded line with your ohmmeter, it will be necessary to connect the line and ohmmeter as shown in Fig. 930*a*. In this figure the wire *M W N* represents the graduated resistance wire of your ohmmeter and the circuit *M D N* includes the grounded wire and the good wire of your line. To perform the test you will tap along the wire *W M* until a point of balance is reached and note the resistance of the wire from the feeler to *M*, after which you would apply the customary Varley loop formula.

A much more simple plan for arriving at the distance from *M* to the fault would be to use your ohmmeter as shown in Fig. 930*b*. First connect point *A* to *M* and point *B* to ground and measure the resistance, then leaving *B* grounded, attach point *A* to *N* and measure the resistance. Note these readings and then measure the resistance of the circuit *M D N* by attaching *A* and *B* to *M* and *N*.

It is evident that in both of the first two readings the resistance of the fault has been included, therefore if we add the first and second readings and from the sum of these subtract the third reading we will have left twice the resistance of the fault. Twice the resistance, because it has been included in both the first and second reading. Then if we subtract half of this result from the first reading we took we will have the resistance of the grounded line from *M* to the fault and knowing the resistance of the wire per foot, the distance may be readily determined.

Your second question is answered, in that we have considered the use of the ohmmeter in considering the second method for determining the location of the ground.

INDUCTION NOISE FROM HIGH TENSION CIRCUIT.—(931.)

We have a metallic circuit on high tension poles. The high tension lead carries 10,000 volts. The telephone wires are not closer than eight feet to the high potential wires, excepting at the transformer, where they pass within one foot of each other. We have transpositions cut in the telephone circuit every half mile for the entire length of the circuit, which is about four miles. What we want to know is: Do we get our noise from the high tension circuit, especially at the transformer? I claim that if we cut our lines away from the transformer, two or three spans, to the opposite side of the road, we will not get so much inductive noise. Am I right or not? H. A. N., Ohio.

The noises on your telephone line are caused to large degree, no doubt, by their close proximity to the power lead bearing the 10,000 volts. It is quite probable that a large percentage of the inductive disturbance originates at the transformer where the wires are so very close together.

We would suggest that you remove the telephone lead to the other side of the road as soon as possible, not only as a means of removing the disturbances you are now experiencing, but as a wise move against the day when one of the power wires will break and fall across your telephone line, causing untold injury to your instruments and switchboards, as well as jeopardizing the lives of your employees and subscribers.

You will have to keep your telephone line absolutely clear from even the slightest grounds in order to avoid noise by leakage, as well as that proceeding from induction.

SWITCHBOARD DROPS GROUNDED ON WRONG SIDE.—(932.)

We have in use a visual signal, self-restoring switchboard, with magneto drops installed for our long lines. The majority of our lines in town are metallic, but a very few are return ground lines, while all of our long lines are ground return. We notice that that when one of our long lines is connected to one of the grounded lines in town, that neither party, nor the operator, can hear, but by disconnecting either line the operator can hear the other party distinctly. Will you kindly tell us where to look for this trouble and the best way to remedy it? M. T. E., Florida.

Judging from the description you give of the trouble you have when you connect one of your long grounded lines to one of your local grounded lines we would say that in all probability you have connected the ground connection to the wrong side of one of the line jacks. This being the case, when the two lines are connected together there would be a short circuit to ground between them and they would not be able to converse with each other or with the operator when the two lines were connected together. As your operator's equipment is not grounded at all she would be able to talk to either party when the other line was not connected, as her talking set would simply complete the circuit out over the line wire, through the instrument, to ground, back through ground to the central office and into the line jack.

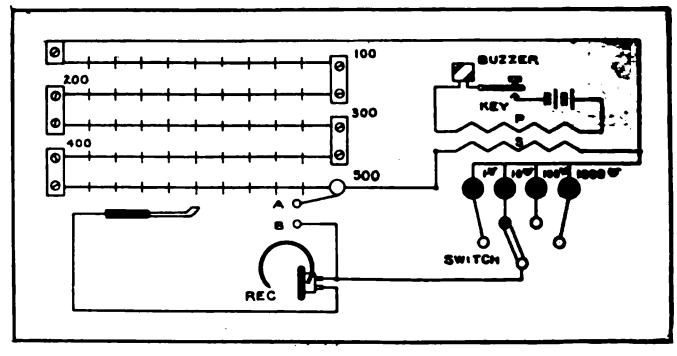

Fig. 930b.

Much trouble of this nature is experienced by companies having grounded lines running into full metallic boards that could be obviated by the application of a little more care in connecting the lines in at the outset.

This trouble will always manifest itself on all of the cords of the switchboard, so that when it is discovered it is only a matter of determining which of the lines is incorrectly connected to locate the cause of the trouble.

You will be able to clear this trouble by arranging the connections on your line drops and jacks so that the tip and sleeve of the jack are always uniformly connected to either the line or ground throughout the board.

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"Leave not that to chance, which foresight might provide for or care prevent."

HE-IS-A-TOUGH CUSTOMER

But we have him safe!

WE will furnish the "Arrester,"
YOU furnish the "Good Ground."

REMEMBER! without "Good Ground" "Arrester" has no place to take him.

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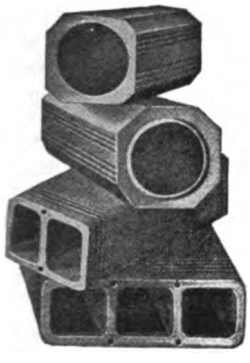

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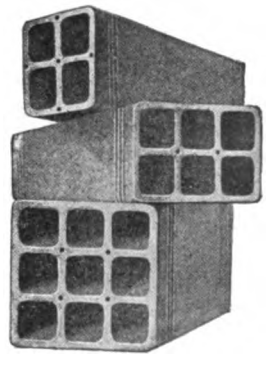

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Recent Telephone Patents

LOCK-OUT TELEPHONE SYSTEM.

F. E. Mayberry, Medford, Mass., patent No. 867,892, Oct. 8th, 1907, assigned to Boston Telephone Selector Co., Boston, Mass.

This patent covers circuit arrangements for a lock-out telephone system employing at substations a controlling device described in patent No. 691,281. Associated with the hook switch at each subscribers' station is a grounded movable spring, so arranged that when the telephone is removed from the hook this spring makes a passing contact with one side of the line, and then permanently engages the contact associated with the other side, thus grounding it. In doing this it operates the bridged lock-out magnets at all other stations on the party line, making it impossible for a conversation to be carried on from them. It also operates in the common battery system a line relay, or a magneto drop in a magneto system, the current for actuating this device being furnished from a special battery at the central office, and carried through a third wire to the drop or relay and thence to one side of the line.

When the connection is put up, the operator, by means of keys adapted to bring one or the other side of the line into connection with the ground, and also with the ungrounded side of battery, may throw a succession of current impulses out over the line to operate the controlling devices at the substations, locking out all parties except the one desired. Supervision is obtained by means of a special two pole double wound relay inserted in series with the windings of a repeating coil on each side of the cord circuit. The control of this relay which serves for the proper illumination and extinguishment of lamp signals, which are employed both in systems having magneto line signals and local battery talking, and the common battery systems, is effected on the operation of the hook switch at the subscribers' station by means of the balancing or unbalancing of the pull of the respective poles, due to the local ground connection.

ARRANGEMENT OF SUB-STATION CIRCUITS FOR INCREASING EFFICIENCY OF TRANSMISSION.

D. M. Therrell, Charleston, S. C., patent No. 865,215, Sept. 3, 1907.

The inventor sets forth that, in accordance with well-known laws governing the action of a transformer, a reduction in the secondary or line current causes a corresponding increase in the impedance of the primary coil, thus cutting down the primary current. A means of increasing the primary current is to neutralize the impedance offered by the primary winding for essential frequencies of voice currents. This invention contemplates the division of the primary circuit into two or more multiple circuits, and the insertion into each branch of balancing inductance and capacity to offset the self-induction of the primary winding, so that each branch may satisfy the conditions of resonance for a given essential frequency. When this is accomplished the primary current depends upon the ohmic resistance of the circuit. When a condenser is inserted, as shown in the illustration (Fig. 7), the operation of the transformer serves to cause its alternate charge and discharge, corresponding to the fluctuation in the difference of potential between points 3 and 4

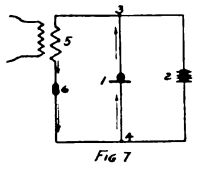

Fig 7

due to the variation in the C R drop through the varying resistances of the transmitter. This current, which charges and discharges the condenser, being alternating in character, produces a maximum variation in the primary winding, thus effecting a considerable change from instant to instant in the magnetic flux set up in the primary core, which determines the amount of current induced in the secondary. This flux rises to a positive maximum, and then falls through zero to a negative maximum, instead of presenting the condition of a magnetic flux constant polarity which is merely reduced to a certain percentage of itself, as is the case when a direct current through a primary is varied in strength. This increases the efficiency of the transformer.

In common battery systems, where the resistance of the battery is insignificant as compared with that of the transmitter, an

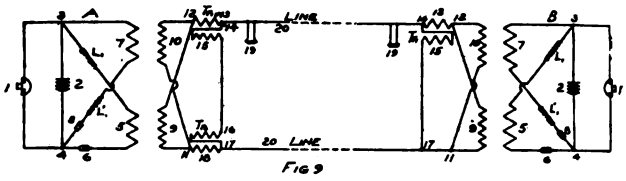

Fig 9

arrangement having an equivalent effect is to bridge the terminals of multiple primary windings in series with one of which is a condenser, with a coil of high inductance and low resistance. Transmitter and battery in series are connected across the respective terminals of these multiple circuits.

By inserting between points 3 and 4 multiple groups of primary windings, each one in series with inductance and capacity of suitable dimensions, each branch may be made resonant for a desired frequency, thus making it possible to secure efficient transformation for each necessary voice overtone. By connecting the secondaries 9 and 10 of the plurality of primary circuits in multiple, as shown in Fig. 9, and inserting compensating transformers Tr_1 Tr_2 in series with the line in such a manner as to set up currents which will neutralize the impedance of the secondary at the receiving end of the line, the inventor states that he provides a means of increasing the amount of current received, and as a consequence the efficiency in receiving. This effect was developed as a result of the recognition that the primary inductance and transformation ratio are directly related to the effective secondary resistance; in fact coils having a transformation ratio greater than unity have their effective secondary resistance increased in proportion to the square of this resistance. The practical effect of the transformers is to create an equivalent tertiary coil on short circuit and in multiple with the secondary. Thus the effective secondary resistance is brought so low as to present a condition analogous to that obtained when the secondary is short circuited during the reception of incoming currents.

REINFORCED CONCRETE POLES.

W. M. Bailey, Richmond, Ind., patent No. 867,335, Oct. 1st, 1907, assigned to American Concrete Pole Co., Richmond, Ind.

This patent covers a form of reinforced concrete pole described on page 178 of AMERICAN TELEPHONE JOURNAL, issue of September 14th, 1907. The drawings accompanying the patent are similar to those published at this time in Fig. 1.

The basic framework of the structure consists of a group of twisted steel rods, preferably four or eight in number, extending longitudinally, and symmetrically arranged about the axis in such a manner as to taper gradually towards what is designed to be the top of the pole. These rods are bound together to prevent their spreading outward, or other distortion, by a spiral winding of wire, or wire interlaced among the rods extending continuously from the bottom to the top. This reinforced structure is placed in a frame of appropriate dimensions, which is then filled in with concrete, forming, when it hardens, a solid structure, symmetrically built up about the reinforcements. The pole may be built in a vertical position, thus avoiding the labor of erection for large sizes, or the forms may be laid horizontally where it is desired to make several poles at the same time and place, in which case they are transported after completion to the points at which they are to be used.

By the insertion of suitable pins, and their subsequent removal in the proper manner when the cement is soft, holes may be made for supporting steps, cross arms and braces necessary on a telephone or telegraph pole.

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J. GEORGE IHMSEN SAYS:

P. C. BURNS
President

J. G. IHMSEN
Gen'l Manager

American Electric Telephone Company

AS A MANUFACTURER AND ADVERTISER

Chicago, Ill.

The American Telephone Journal, New York.

Gentlemen: Your paper, it is conceded, is the leading telephone journal. We have been among its patrons for years, and we have received the very best results. Your paper is a fearless defender of Independent telephone interests and is an important factor in the field.

Yours very truly,
J. G. IHMSEN.

J. G. IHMSEN

GENERAL MANAGER
AMERICAN ELECTRIC TELEPHONE CO.

PRESIDENT
TELEPHONE MANUFACTURERS' ASSOCIATION

AS PRESIDENT OF THE TELEPHONE MANUFACTURERS' ASSOCIATION

Chicago, Sept. 13, 1907.

American Telephone Journal, New York.

Dear Sirs: The writer begs to acknowledge receipt of your favor of the 7th inst., enclosing affidavits of C. Godwin Turner and Samuel Rosenthal relating to circulation of The American Telephone Journal, which I shall be pleased to present to the manufacturers at their next meeting.

Will you kindly mail to me about a dozen copies of the special circular which you are sending out in regard to our request in relation to your circulation.

The candid exposition of your attitude as shown in the circular should certainly prove advantageous to your publication.

Yours very truly,
J. G. IHMSEN,
President Telephone Manufacturers' Association.

NOTE.—C. Godwin Turner is a certified public accountant, and Samuel Rosenthal is President of The Technical Press, printers of American Telephone Journal.

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With the Manufacturers

A NEW COMBINATION PROTECTOR AND DISTRIBUTING BOARD.

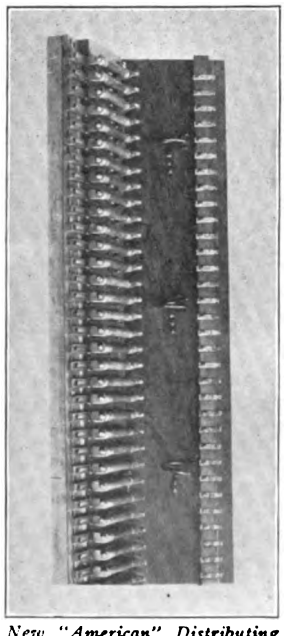
THE American Electric Fuse Company, Muskegon, Mich., is placing on the market a new combination protector and distributing board in which many commendable ideas are embodied. This board is made of two panels of well seasoned maple boiled in linseed oil, which are so hinged together as to allow of ready access to the clips to which are attached the conductors of the outside cable. On the movable panel are mounted carbon lightning arresters and wooden enclosed tubular fuses. The fuses are firmly held in place by hook contacts, from which they may be removed or replaced without the use of tools of any sort.

It is claimed that, by the use of this form of fuse in connection with protector boards, much of the trouble incidental to the fuses of the mica type is entirely eliminated, and that the cost of operation and maintenance is greatly reduced.

On the panel designed to be firmly attached to the wall, and to which the movable one is hinged, are mounted suitable clips for the attaching of the switchboard cable, and it also carries distributing rings for the jumper wires connecting the outside cable and the switchboard terminals. This board, which is a unique and convenient combination, is shipped equipped with fuses. Any one interested may secure additional information by addressing the company and mentioning the code number 131.

W. N. MATTHEWS & BRO., 209 N. 2nd street, St. Louis, Mo., are making a special offer on the Stombaugh guy anchors. The company has hit upon a unique scheme of sending out to prospective customers a postal card order blank, printed in ink which will copy, which provides a separate space for each size of anchor. These can be used for trial orders for a certain specified number of anchors by adding the signature to a statement that shipment is desired on thirty days' trial, which may be had free of charge. These postals are mailed with folders giving full information concerning the size and holding powers of the Stombaugh anchor, and a description of its construction and the method of using it. The names of some important telephone and electric companies which use this appliance are also furnished.

WIRE AND TELEPHONE COMPANY OF AMERICA, Rome, N. Y., announces that the demand for its wire and telephone products in the South has made made necessary the opening of an office to take care of it. The Besco Supply Company of Birmingham, Ala., has been appointed agent, and a stock of bare and rubber covered wire, magnet wire, annunciator wire, and telephone apparatus will be kept there so as to take care of orders for immediate delivery.

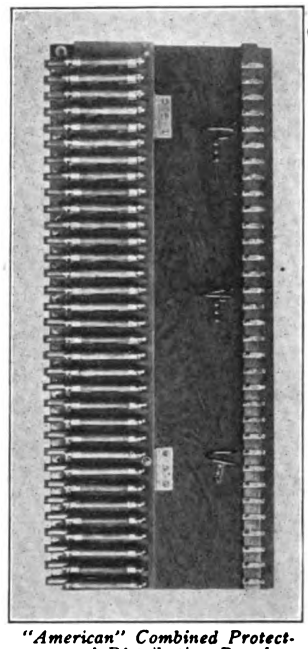


New "American" Distributing Board; One Panel Swung Out for Attachment of Cable.

The Wire and Telephone Company of America has recently started up its new bare wire mill and the extension to the old insulating mill and telephone plants. The additional equipment gives this company a very large capacity for the manufacture of all kinds of bare and insulated copper wire and telephone apparatus.

Stocks are maintained at the headquarters of the company in Rome, N. Y., and with its agents, The Commercial Electric Supply Company of St. Louis, Mo., Mr. F. W. Pardee of Chicago, Ill., H. I. Wood Electric Company of Louisville, Ky., and the Besco Supply Company of Birmingham, Ala.

THE DRIVER-HARRIS WIRE COMPANY, Harrison, N. J., issues a catalogue of resistance material useful to telephone companies, which incidentally contains a good deal of valuable general information. The book gives prices of Climax resistance wire, which is claimed by the company to have the highest specific resistance of any wire in the market. Its resistance is about fifty times that of copper as compared with the 18-fold resistance of German silver. Other valuable qualifications are set forth by the company.



"American" Combined Protector and Distributing Board.

In this book full resistance tables, showing the properties of wire, including resistance at various temperatures for sizes up to No. 36, are presented. Figures on resistance ribbon are also given. In the general tables is a standard copper wire table, and a table showing the difference between wire gauges which will be a convenient thing in many telephone exchanges. Other special resistance materials besides the Climax are fully described, and their properties set forth in tables.

Copies of the book will be sent free of charge to telephone managers and others who contemplate using wire for special resistances of any kind.

A TELEPHONE BOOK FOR OPERATORS OF RURAL LINES.

PRACTICAL telephone knowledge is something that the rural line operator must have in order to keep his instruments in condition to talk, and bring him in a profit instead of making each year show a small loss. There are many people who have more or less to do with telephone lines carrying only a few instruments, whose principal duties make it impossible for them to give up too much time to a detailed study of the telephone business, and they do not care at all about taking up the question from a technical standpoint. What they want to know is what things are to be looked for in purchasing instruments that will give good service and last well, how lines should be built and instruments installed in order that they may stand up under constant wear and give good service, how to trace out the principal troubles, and how to run the business affairs of the association to which they belong. This is just the kind of information which is contained in the latest edition of "The Rural Telephone," a book published by the Swedish-American Telephone Company, Chicago, Ill., for free distribution among telephone men in thinly settled districts, or whose lines make connection with farmers' lines. It covers a very considerable range of subjects; and all of the information in the book is not only of a useful character. but is arranged in such a way as to be readily understood even by a beginner in telephone work, while going far enough into the subject to give many useful practical hints even to a man who has been building lines and equipping them for several years.

WESTON ELECTRICAL INSTRUMENT COMPANY, Newark, N. J., is finding an increasing demand for special instruments among telephone companies. For years past the Weston voltmeters and am-

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THE CALCULAGRAPH

PREVENTS COMPLAINTS AND DISPUTES

If a subscriber asserts that he did not talk to such and such a place on such and such a day, or that he only talked so long instead of the time shown on your bill, show him the Calculagraph record. It is convincing and

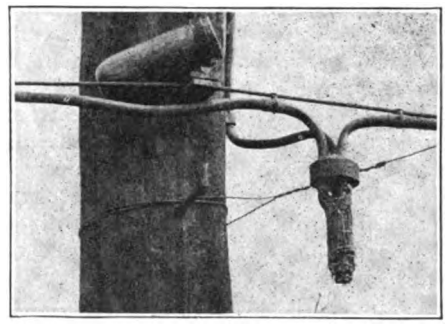
IT MAKES NO CLERICAL ERRORS

Get Our Reason Why Booklets.

CALCULAGRAPH COMPANY

1437 JEWELERS BLDG., NEW YORK CITY

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.



MAKING TESTS IN TELEPHONE CABLES

WHERE HARGIS JOINTS ARE USED

Take your pair of spanners, unscrew the pot from the ring, unlace the pairs and spread them out like a fan. You can then test any of the pairs with greater ease than you can test pairs on the outside layer of a Horizontal Wiped Joint. When test or repair is finished, all that you have to do is to screw the pot on to the ring and tighten with a pair of spanners, and you have a perfect moisture-proof joint. It is not necessary to drag the cable platform, block and tackle, below torch, etc., from one joint to another.

The expense of a groundman can be eliminated when looking for trouble or making tests when Hargis Joints are used. These are only a few reasons which demonstrate the advantages of the Hargis Cable Splicing Joint.

If you are considering new cable construction or wish to change your Horizontal Wiped Joints to Hargis Joints, on account of their convenience, write us to-day. You will save time and money. You will improve your cable construction.

W. N. MATTHEWS & BROTHER

Manufacturers of Patented Specialties

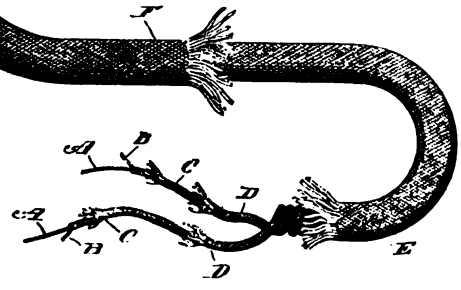
214 N. 2d St., St. Louis, Mo.

Branches: New York, San Francisco

Premier BB Steel Cord

CONDUCTORS A-B are made of special prepared hard drawn steel wire, insuring flexibility and durability. Owing to the high resistance of the steel wire, a winding of copper wire is applied to reduce the resistance.

INSULATION C-D. Each conductor has a triple insulation, the first consisting of a serving of silk, the second of a serving of cotton, and the third a braiding of waxed cotton.



FORMATION. Both conductors are formed into a concentric spiral as illustrated by cut. Over the spiral is applied a braiding of cotton on the longitudinal effect for the purpose of taking up any possible stretch in the cord.

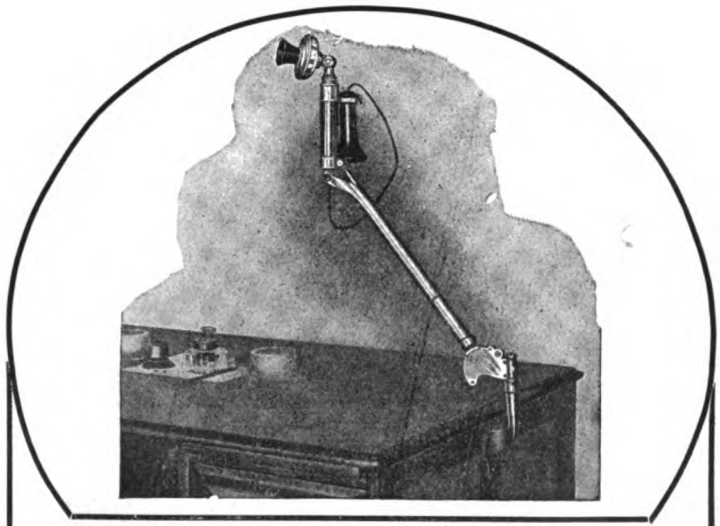
RE-ENFORCEMENT SPRING made of very high grade steel wire is inserted in the hollow of the cord at PLUG END for the purpose of doubly re-enforcing the cord at the end that is subject to the greatest usage. The spring is inserted in a manner that prevents the conductors from being thrown out of alignment, making it almost impossible to break the cord at the PLUG END—regardless of how the operator may insert or jam it into the switchboard jacks.

OVERALL BRAID E-F. Consists of special high-graded linen thread boiled in wax. A double braiding is applied at the plug end for the re-enforcement.

Let us quote you our new prices
They're in your favor

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton St., Chicago



"FLEXIPHONE"

THE 'PHONE OF THE HOUR

- ¶ Will save your company from 1-3 to 1-2 of your present maintenance expense.
- ¶ No more broken Transmitters or Receivers.
- ¶ Self-balancing in any position.
- ¶ Mouth-piece revolves, and always facing person talking.
- ¶ Attachable to any wood-work anywhere.
- ¶ Supplied with any Standard Transmitter or Receiver.
- ¶ Adopted by some of the Largest Exchanges.
- ¶ An ideal extension set for private office—overcomes the objections of the "always-in-the-way" desk set.
- ¶ Is the 'phone for the home—makes its own place and fits the family.

CUTS MAINTENANCE COST IN HALF

OLIVER MFG. CO., Inc.
Philadelphia, Pa.

Holtzer-Cabot Electric Co.
Boston, Mass.—Chicago, Ill.

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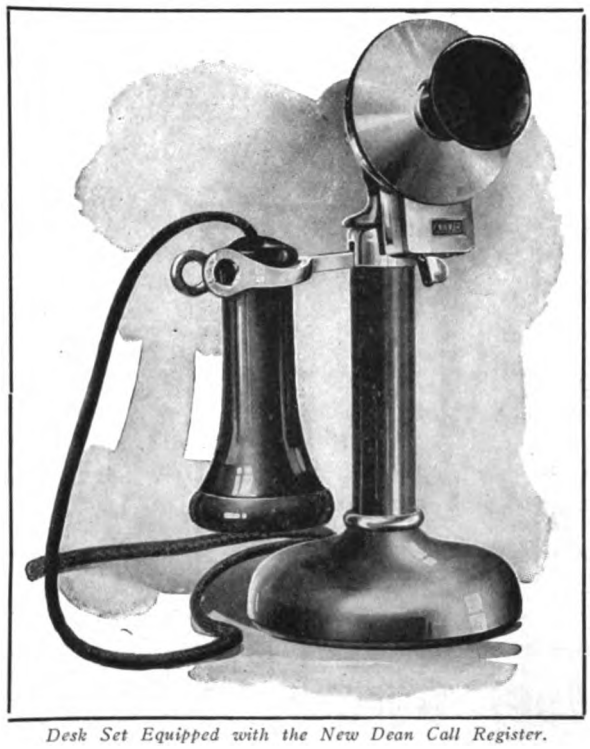
meters have been used on switchboards and test sets, and in many telephone exchanges Weston galvanometers are being used for testing long distance lines. The company is, however, manufacturing a number of other special instruments which are particularly adapted to tests which can be made more rapidly by their use than by others. They afford direct readings where results can only be obtained through the use of more or less complicated figuring if the more common types of instruments are used. The company will be pleased to send full information concerning these special instruments upon receipt of a request.

THE DEAN SERVICE METER.

THE Dean Electric Company, Elyria, O., believes that the use of a call register at each sub-station in connection with the measured service system of charging will prevent controversies which sometimes arise under this system. When properly used such a register gives each subscriber not only a means of checking his account at the end of the month, but also of knowing its exact status from day to day, and this method is much easier than making a pencil record. The device furnished by the Dean Company known as its type C service meter, is mounted upon an extended portion of the transmitter shell. When operated it not only registers a call, but transmits over the line an audible signal.



Desk Set Equipped with the New Dean Call Register.

The counter is located where it will be in plain view of the subscriber, just below the transmitter mouthpiece, and is operated by a slight pressure of the thumb. The meter does not require any special transmitter or peculiar circuit and does not interfere in any way with the customary method of using a desk set or wall telephone in either a magneto or common battery system. Any further information desired can be obtained from the Dean Company's booklet No. 14, which will be sent to all interested persons.

MR. CHARLES A. BROWN, Patent Attorney, 1550 Monadnock Block, Chicago, Ill., has recently announced a partnership with Lynn A. Williams, who for six years past has been Mr. Brown's assistant. The new firm will continue the practice of patent law in the present offices under the firm name of Brown & Williams.

STERLING ELECTRIC CO., Lafayette, Ind., reports that during the past three months it has done a very large amount of installation work, including not only several complete central offices of considerable size, but also private branch exchanges, protective devices and telephones. Among the larger orders are those for a 5000 capacity common battery multiple switchboard and complete exchange equipment for the Home Telephone Company of Wabash, Ind. This job will be completed during the present month, when the company will have a first class plant.

For the Lafayette Telephone Company, Lafayette, Ind., an exchange equipment for an ultimate capacity of 8000 lines is well under way. The Lafayette Telephone Company expects to be giving service from its new plant in a very short time.

THE DEAN ELECTRIC COMPANY wishes to call attention to the cut used in its advertisement appearing in the October 12th issue of this paper. Through error a cut of the old standard toll section was used, instead of a cut of the new common battery, non-multiple section. The Dean Company reproduces the same advertisement in this issue, but showing the proper cut in connection with the reading matter.

CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., has arranged for an immediate shipment of a common battery selective multiple lamp signal switchboard and telephones to Charleroi, Pa. A common battery lamp signal switchboard also has been ordered for Holden, Mo.

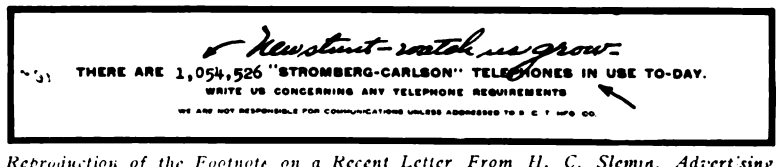
Other important orders received recently were for the complete common battery private branch exchange equipment, including telephones from the Meadville Telephone Co., Meadville, Pa., and a common battery switchboard and telephones for the General Railway Signal Company, Rochester, N. Y.

MATHIAS KLEIN & SONS, 87-89 W. Van Buren street, Chicago, Ill., are calling the attention of telephone men to their new "Chicago grip." This is light, well proportioned and so shaped as to be very easy to handle. When placed upon a wire it will hold itself in position. In handling it linemen can easily push it out on the wire so as to get as much slack as necessary. Its pull is straight, consequently it leaves no kinks. The grip is designed to do good work on either copper or iron wire and the company believes that it has provided a tool which will meet the approval of the most critical users. It is made of steel throughout and nickel plated. Any further information desired about its construction or prices will be sent to interested persons upon request.

GUY STEVENSON, Byer, Ohio, is making interesting terms on chestnut poles, ready for immediate delivery. He will furnish full information concerning the special merits of his present stock, prices, and facilities for shipment to interested persons who make immediate inquiry.

MR. A. C. BELL, who has been in charge of the patent department of the Stromberg-Carlson Telephone Manufacturing Co., has recently accepted a position in the offices of Brown & Williams, 1550 Monadnock Block, Chicago, Ill., where he will give his attention chiefly to the work of patent soliciting.

In addition to his special training, which has been derived from several years' work in soliciting patents, Mr. Bell, who is a graduate of Cornell University, has had practical experience as a mechanical and electrical engineer.


Newsstunt-watch us grow-
THERE ARE 1,054,526 "STROMBERG-CARLSON" TELEPHONES IN USE TO-DAY.
WRITE US CONCERNING ANY TELEPHONE REQUIREMENTS

Reproduction of the Footnote on a Recent Letter From H. C. Slemin, Advertising Manager of the Stromberg-Carlson Company. Typewritten Numbers are Changed From Day to Day as Sales Increase. A Good Idea!

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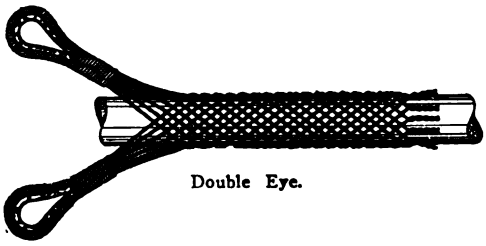
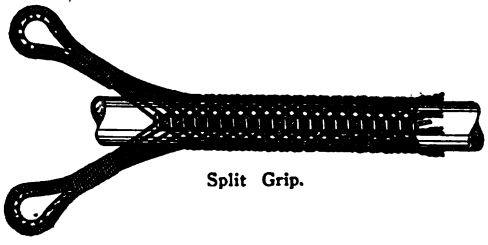
UNIVERSALLY ADOPTED
by all Progressive Telephone Companies

Universal Cable Grips



Double Eye.

Single Eye.



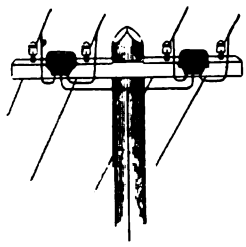
Split Grip.

reduce the cost of cable construction materially, in that cable may be installed, pulled into ducts, pulled out, or slack pulled up at a great saving in time by their use. No danger of injuring the cable sheath or conductors either.

You will find it to your advantage to know all about these wonderful money savers. WRITE TO-DAY FOR SAMPLE.

Universal Cable Grip Co. SYRACUSE, N. Y.

CHAPMAN LIGHTNING ARRESTERS



MECHANICALLY AND SCIENTIFICALLY .. .. CORRECT. .. ..

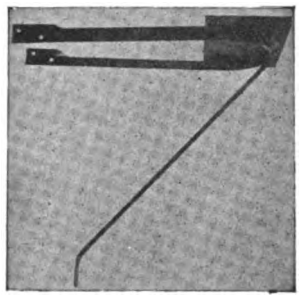
They are absolutely weatherproof in construction, so that when placed on the most exposed parts of the line the elements have no effect upon them.

The adjustment of the discharge plates is so accurate that the line is drained of static accumulation as fast as it builds up.

Write for sample NOW.

MINNESOTA ELECTRIC CO., Minneapolis, Minn.

H. E. COBB, Selling Agent, 1501 Monadnock Block, Chicago, Ill.



$ ONE $
Yankee Polo Seats

CAN'T BE BEAT FOR TWICE THEIR COST

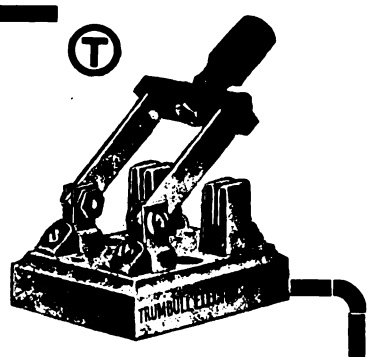
Made of 1½ inch angle iron, painted with a weather proof asphalt paint, to which is bolted a 1⅛ inch seasoned, creosoted pine seat.

STRONG—DURABLE—NEAT

OTHER SPECIALTIES DESCRIBED IN OUR BULLETIN, WHICH MAY BE HAD FOR THE ASKING.

THE TELEPHONE APPLIANCE CO., MINNEAPOLIS, MINN.

TRUMBULL TELEPHONE SWITCHES



PRICE GREATLY REDUCED

CAT. No.		LIST	STD. PKG.
707	S.P.S.T.	$ .20	150
708	S.P.D.T.	.32	100
709	D.P.S.T.	.35	100
710	D.P.D.T.	.50	50

SUBJECT TO YOUR REGULAR DISCOUNTS

WRITE FOR BULLETIN

SELF-ADJUSTING CLIPS HELD FIRMLY IN RECESSES IN THE BASE INSURE A PROPER ALIGNMENT

SELECTED PORCELAIN USED EACH SWITCH INSPECTED

THE TRUMBULL ELECTRIC MFG. CO.

NEW YORK 136 LIBERTY ST. PLAINVILLE, CONN. BOSTON 65-67 OLIVER ST.

MR. BUSY-MAN
HAS IT

The Easophone Smile

Well, do I like it?
You are a good friend.
I will tell you why.
It is *out of the way.*

The cord *doesn't get mixed up* with my papers and other things on the desk. It doesn't get *knocked off* on the floor. When anyone comes in and wants to use it, he doesn't *disturb the papers* on the desk, or *get in my way.* It takes up *no space* on the *"business end"* of the desk.

I have *one hand free* when talking, *can lean back in my chair,* and *talk with comfort.* No *heavy standard* to hold. No leaning over to the transmitter. Always *ready,* always *talks up,* always *convenient.*

WRITE FOR BULLETINS Nos. 101 AND 102

The Wire & Telephone Co. of America, Rome, N. Y.

Manufacturers of Telephones, Telephone Supplies, Bare Copper and Magnet Wire

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News Notes That Are New

NEW COMPANIES.

BRADLEY, ARK.—Articles of incorporation have been filed by the Walnut Hill Telephone Company of Bradley, which contemplates the construction and operation of telephone plants at Walnut Hill and Lewisville in Lafayette county, and at Waldo, in Columbia county. It has an authorized capital stock of $15,000, and the incorporators are T. H. Dismukes, G. M. McKnight, A. H. Hamter, J. W. Warren and J. McCormick.

COATESVILLE, IND.—The Coatesville Telephone Exchange Company has been incorporated with a capital stock of $1,500. Among the incorporators are Jesse Maston, H. T. Bohannon, S. Hunt, E. S. Messler, S. H. Hunter, D. S. Bowen and F. F. Todd.

POLLOCK, LA.—Having become very much dissatisfied with the treatment accorded them by the Cumberland (Bell) Telephone and Telegraph Company, the business men of this town have organized an Independent telephone company. Sufficient stock has been subscribed to insure the installation of a first class system, and construction work is to be commenced at once.

SEMINARY, MISS.—An Independent telephone company, to be known as the People's Telephone and Telegraph Company, has been organized by a number of the most prominent business men of this place. It is capitalized at $10,000, and its plans cover the construction and maintenance of telephone lines in Seminary and throughout the surrounding country.

VICTOR, N. Y.—A new Independent telephone company, whose purpose is to construct a telephone line to take in the territory formerly covered by the People's Telephone Company, is being formed by the citizens of Victor, Bristol and East and West Bloomfield. Articles of incorporation are to be filed with the Secretary of State at once, and it is expected that work on the system will be commenced. This action has been brought about by the poor service which the Empire State Telephone and Telegraph Company is alleged to have given the people in the above named towns since it took over the property of the People's Telephone Company.

MANTEO, N. C.—Articles of incorporation have been filed by the Roanoke Island Telephone Company, of Manteo, Dare Co., whose object it is to construct a telephone system in and about that city. It has an authorized capital stock of $1,000, and the incorporators are Theodore S. Meekins, R. U. Smith, S. C. Griffin, J. D. Hayman and W. J. Griffin.

ENDERLIN, N. D.—The Enderlin Telephone Exchange Company, of Enderlin, N. D., which has a capital stock of $50,000, has filed articles of incorporation. The incorporators are D. H. Hurd, M. E. Hurd, of Enderlin, N. D., and S. F. Scott, of Valley City.

BEALLSVILLE, O.—Articles of incorporation have been filed by the Citizens Telephone Company of this city. Its capital stock is placed at $3,000, and the incorporators are H. G. Pugh, D. G. Workman, J. H. Arnold, J. L. Decker and A. Hudson.

HAMILTON, O.—The Home Telephone Company, which was incorporated in New Jersey some time ago, has filed articles of incorporation at Columbus, and expects to take over all the home companies in Hamilton and Middletown. Among the incorporators are Wm. Thompson, O. M. Blake and other Hamilton people.

HOT SPRINGS, S. C.—Among the newly organized Independent telephone companies is the Spring Creek Telephone Company, of Hot Springs, Madison Co. It expects to build and operate telephone lines from Hot Springs to points in Buncombe and Haywood counties. The capital stock is given as $5,000, of which $1,275 has been subscribed. Among those interested in the new enterprise are I. N. Ebbs, C. J. Ebbs, Thomas Frisbee, Thomas Lawson, S. N. Brown and others.

MATTOON, WIS.—The Mattoon Telephone Company is the name of the most recently organized Independent telephone company at this city. It has an authorized capital stock of $2,500, and those responsible for its formation are Theodore Kroz, J. F. Riordan and E. E. Hemmingway.

WOODSTOCK, N. B.—Because of the high rates charged by the New Brunswick Telephone Company, and the indifferent service which it has been rendering to its patrons, the citizens of Woodstock have decided to organize a local company and install a system of their own. Application for a charter has been made by the new company, which is to be known as the Citizens' Telephone Company, and it is to have an authorized capital stock of $24,000, divided into 2,400 shares of $10 each.

FRANCHISES.

POCATELLO, IDAHO.—An ordinance granting to A. D. Coons, of the Utah Independent Telephone Company, a franchise to maintain and operate a telephone exchange in this city was passed on its final reading with but two dissenting votes.

PRINCETON, ILL.—At a recent meeting of the Bureau County Mutual Telephone Company, held at Bureau township, it was decided to apply to the city council of Princeton for a franchise to install and maintain a telephone system in that city.

PALMYRA, MO.—Permission to erect and maintain a telephone line from this city through the South River township has been granted to George H. Bower.

CENTREVILLE, N. J.—Permission has been granted to the Delaware & Atlantic Telephone Company by the County Board of Chosen Freeholders to construct a line connecting Centreville and Port Republic.

COVINGTON, O.—The Fitzsimmons Telephone Company, which has recently been granted permission to string additional wires in Cincinnati, has applied for a franchise at Covington.

HURON, S. D.—Application for the renewal of its franchise in this city has been made by the Dakota Central Telephone Company. If it is granted, the company promises to erect a building to be used as headquarters and a central station, and to install an entirely new system.

DALLAS, TEX.—Application for a franchise to establish an Independent telephone system in this city has been made by A. J. Brown, John A. Barnard and C. F. Freeman, of Dallas, and E. L. Swaine and F. J. Norris, formerly of Los Angeles, and now of Dallas. The applicants for the franchise state that it is their intention to give both local and long distance service, and they promise that about $2,000,000 will be expended in the installation of the local system, work on which is to be commenced within six months from time of the granting of the franchise.

VANCOUVER, WASH.—The application of the Home Telephone Company for a franchise in this city, at which place it is meeting with the determined opposition of the Pacific States (Bell) Telephone Company, is shortly to come before the city council for final action.

ELECTIONS.

ELLSWORTH, ILL.—At a recent meeting of the Dawson Township Mutual Telephone Company G. A. Richardson was elected president, and W. D. Wrightman, secretary and treasurer.

COLUMBIA CITY, IND.—The officers of the Farmers' Mutual Telephone Company are Albert Bush, president; Melvin Blain, first vice-president; C. W. Alexander, second vice-president; C. R. Banks, treasurer; W. H. Carter, secretary; John C. Pentz, superintendent of construction. The directors are: Albert Bush, Lewis Plummer, Jesse Miller, E. E. Rindfusz, C. W. Alexander, C. R. Banks, Sherman Hively, Melvin Blain and W. H. Carter.

BURLINGTON, IA.—The stockholders of the Henry County Telephone Company have elected the following officers and directors: W. J. Francy, president; J. E. Peterson, vice-president; A. D. Hayes, secretary; V. Z. Brenneman, treasurer; W. J. Francy, W. R. Buchanan, J. A. Clark, C. P. Johnson, J. T. Laughlin, Jas. Portlock and J. E. Peterson, directors

LONG GROVE, IA.—The Long Grove Telephone Company has elected the following officers: President, R. K. Brownlie; secretary and treasurer, Geo. P. Maxwell. The executive board is composed of R. K. Brownlie, G. P. Maxwell, Bernard Litscher, Gustav Helkins, James Wyer and Samuel Baughman.

FINANCIAL.

COLUMBIA CITY, IND.—The reports of the officers of the Farmers' Mutual Telephone Company show a very satisfactory condition of affairs: The amount invested in the plant is $60,000, $23,000 of which is in stock, $24,000 in bonds, and $13,000 of the earnings of the plant since it started. The total rentals earned last year were $16,400, of which all but $2,500 has been collected. The expenses of operating the plant last year were $7,900, and the amount expended for material and construction was $9,000.

GRAND RAPIDS, MICH.—The citizens' Telephone Company has declared its regular quarterly dividend of 2 per cent., payable on October 19th.

NEWARK, O.—At the monthly meeting of the Newark Telephone Company the regular quarterly dividend of 2 per cent. was declared on the common stock. The company is capitalized for $60,000 common stock, and $90,000 preferred stock, the former drawing dividends at the rate of 8 per cent. per annum, payable quarterly, and the latter at 6 per cent., payable semi-annually. The company is in a very prosperous condition, having gross earnings of about $4,600 per month, and operating expenses, including insurance and taxes of $2,500.

CHARLESTON, W. VA.—To take care of its rapidly growing business

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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National Pole Company

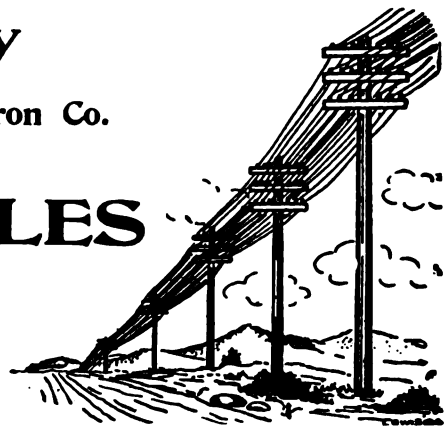
SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from
Maine to Washington



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EVERY ONE WORKS

Guaranteed to give a loud, clear tone and DON'T fry, sizzle, pack or go dead.

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We Make a Full Line of Telephone Apparatus

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Harrison and Clinton Sts.,
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The Man Who Does Not Advertise

THE man who does not advertise because his grandfather did not, ought to wear knee breeches and a queue.

The man who does not advertise because it costs money, should quit paying rent for the same reason.

The man who does not advertise because he tried it and failed, should throw away his cigar because the light went out.

The man who does not advertise because he doesn't know how himself, ought to stop eating because he can't cook.

The man who does not advertise because somebody said it did not pay, ought not to believe that the world is round because the ancients said it was flat. —*Indiana Retail Merchant*

NUNGESSER -1900- BATTERIES

The best evidence of the superiority of the "1900" Dry Battery is the fact that one of the largest electrical concerns in the world has selected it among all others as the best dry battery made.

You will find the "1900" will outlive any battery and give you far better service than any other while it lives.

The Nungessor Electric Battery Co.
CLEVELAND, O.

General Sales Office
128 W. Jackson Blvd. **CHICAGO, ILL.**

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News Notes That Are N[illegible]

the Charleston Home Telephone Company has increased its capital stock from $300,000 to $600,000. There will be $200,000 of 6 per cent. preferred stock and $100,000 of common stock added to the capital. The new issue of preferred is to be sold at par, and it is understood that it has already been largely subscribed.

MISCELLANEOUS.

MILAN, IND.—The property of the Milan Telephone Company, formerly owned by J. H. Connelley, has been acquired by O. M. Bowers, the consideration being $750. Under the new management the plant is to be materially improved.

OMAHA, NEB.—Contracts have been signed between the Independent Telephone Company, of Omaha, and the New State Telephone Company, which operates toll lines in Iowa, Nebraska and South Dakota, whereby the New State Company will connect with the Omaha exchange and become a party to a $5,000,000 corporation which will handle all toll business in and out of Omaha. The Omaha company is now installing its switchboard, and will begin connecting up telephones in December.

TWIN MOUNTAIN, [illegible]nt of the Twin Mountain Telephone Company has bee[illegible] C. Leonard of Whitefield, who intends to build a co[illegible]tween Twin Mountain and the Whitefield exchange.

EDGEMONT, S. D.—[illegible]he Independent telephone system that operates through th[illegible] and into Nebraska, Chris. Jensen, is endeavoring to arran[illegible]lishment of an Independent line connecting the Norther[illegible] Hills. The recent increase in rates by the Nebraska [illegible] Company has brought to its patrons a realization of t[illegible]n Independent company, and its formation is looked for[illegible].

YANKTON, S. D.—[illegible] soon to be established by the Elk Point Telephone E[illegible]e long distance lines of the Independent Telephone Co[illegible]n, and the New State Telephone Company, of Sioux City

VALLEY, WASH.—[illegible]elephone Company, running from Springdale to Chewelah, [illegible]ased by H. L. Fisk, who expects to establish a central offi[illegible]Many improvements and extensions in the system will be c[illegible] the direction of the new owner.

With the Builders

BLOOMINGTON, ILL.—A new exchange building has been erected by the Home Telephone Company in this city, and possession is to be taken of it at once.

BLOOMINGTON, ILL.—The line of the McLean County Telephone Company between Bloomington and Heyworth is being entirely rebuilt, and many other improvements are being planned by the company.

PONTIAC, ILL.—The Livingston County Home Telephone Company, which has been erecting a line between Pontiac and Cornell, expects to make many improvements in its system in this city. It expects to effect connections at Cornell with the line being constructed by the Independent Company of Streator.

TAMPICO, ILL.—The Tampico Farmers' Mutual Telephone Company, which recently refused to make connections with the Bell Telephone Company, contemplates the erection of a trunk line to Rock Falls.

LAFAYETTE, IND.—Work on the construction of the new exchange building for the Lafayette Telephone Company is nearing completion, and it expects to transfer its plant from the old exchange at an early date.

RICHMOND, IND.—The Richmond Home Telephone Company, which has reconstructed its entire system, and has just completed the erection of a new headquarters building, expects to put its new service into operation in a very few days.

HIGHLAND, MICH.—The Highland Rural Telephone Company is extending its lines to Dunham Lake and other points.

METAMORA, MICH.—The Michigan State Line Telephone Company, which owns and operates exchanges in Southern Michigan, Lyons and Metamora, and toll lines between Adrian, Blissfield, Sylvania, Richfield Center, Ogden and other points, has just completed a toll line connecting Metamora and Lyons direct with Delta, where connections have been made with the Delta Home Telephone Company.

DULUTH, MINN.—The engineering department of the Douglas County Telephone Company at Minneapolis is considering plans for the erection of a new exchange building at Duluth.

KIESTER, MINN.—A line from Kiester to Alden, by way of Mansfield, is one of the improvements planned by the Kiester Telephone Company.

LEE'S SUMMIT, MO.—Among the many improvements being made by the Home Telephone Company is the installation of a new switchboard and the erection of new lines. Under the management of W. K. Yankee the plant is to be made thoroughly up to date in every particular.

CARROLLTON, MO.—The Stet, Rockingham & Norborne Telephone Company, among its other extensions and improvements, is erecting a new exchange building at Lebanon, in which it expects to install a thoroughly modern system.

ELY, NEV.—Work is soon to be commenced by the Utah, Nevada and Idaho Telephone Company on its line from Salt Lake to Ely, which will give the latter city connection with almost all towns on the north Pacific coast. The company is also building lines from Eureka to Austin and thence to Goldfield, Mountain City to Elko, by way of Aurora and Tuscarora, and from Elko to Cherry Creek.

COOS, N. H.—New lines are being erected by the Coos Telephone Company in Grange.

WOODBURY, N. J.—The Keystone Telephone Company, which now controls the Eastern Telephone Company, expects to greatly extend this system in Woodbury and Southern Jersey.

ITHACA, N. Y.—An entirely new telephone system is to be installed by the Ithaca Telephone Company in Sheldon Court to replace the old system.

LEICESTER, N. C.—Work on the plant of the newly organized Leicester Telephone Company is to be commenced at once. An exchange is to be installed at Leicester, and lines extend throughout the country. It expects to reach Juno, Turkey Creek and a number of other points.

STATESVILLE, N. C.—To take care of its rapidly increasing business it is the intention of the Iredell Telephone Company to install a new switchboard in Statesville.

LANSFORD, N. D.—Work on the construction of its system is being carried on by the Farmers' Telephone Company.

HAMILTON, O.—The Valley Telephone Company, of Lebanon, which was recently incorporated with a capital stock of $100,000, by O. M. Blake, W. G. Thompson, L. S. Dunham, G. Lowe and Frank Binkley, is soon to commence the construction of its lines. These are to be erected in Warren, Butler, Montgomery, Dayton and Hamilton.

EAST PALESTINE, O.—Among the improvements planned by the Columbian County Telephone Company is the construction of a line from East Palestine to Enon Valley, Pa., which will give the company direct connections with Pittsburg.

CATASAUQUA, PA.—A new exchange is to be installed by the Consolidated Telephone Companies to replace the one which was destroyed by fire several days ago. The new exchange is to have a capacity for six hundred subscribers.

CHESTER, S. C.—A new six hundred drop switchboard is to be installed by the Chester Telephone Company, which expects to make a great many other improvements in its plant.

COLLIERVILLE, TENN.—The lines of the Collierville Telephone Company are to be extended and a new switchboard placed in its exchange.

HOUSTON, TEX.—Active work on the stringing of its wires has been commenced by the Houston Home Telephone Company in this city. Its system is to be extended to Houston Heights, a franchise at that place having been assured, and the erection of a sub-exchange is being arranged for there. It is estimated that the installation of the entire system will represent an expenditure of about $1,000,000.

TEAGUE, TEXAS.—The business of the Central Telephone Company has increased to such an extent that the installation of a new switchboard has become necessary.

SPOKANE, WASH.—A new long distance telephone line between Spokane and St. Joe, Idaho, has been erected by the Interstate Telephone Co.

CASHTON, WIS.—The telephone plant in Cashton, which C. H. Cremer recently purchased from Messrs. Hall and Steel at a cost of about $10,000, is to be greatly improved and extended.

CHIPPEWA FALLS, WIS.—Among the many improvements planned by the Chippewa Falls Telephone Company is the installation of a two hundred drop switchboard. The company also expects to build new lines.

EAST TROY, WIS.—The lines of the East Troy Telephone Company are to be materially extended and improved.

FORT ATKINSON, WIS.—Many improvements and extensions in its plant are being made by the Jefferson County Telephone Co.

WASHBURN, WIS.—Plans are being considered by the Home Telephone Company of Washburn for considerably improving its lines. Some of the local lines are to be rebuilt, and extensions are to be made to Cornucopia, Port Wing and other points.

UNDERGROUND.

CAIRO, ILL.—It is the intention of the Home Telephone Company to spend about $12,000 in conduit work in this city.

SAGINAW, MICH.—Many extensions in its conduit system are to be made by the Saginaw Valley Telephone Company in Saginaw.

TWO HARBOR, MINN.—Underground conduits for the telephone lines to the new passenger station and general offices of the Duluth and Iron Range Railroad Company are being laid.

HOUSTON, TEXAS.—The wires of the Houston Home Telephone Company are to be placed in conduits in the business portion of the city.

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The Pennsylvania Independent Convention

By W. G. Newbold.

THE fourth annual convention of the Pennsylvania State Independent Telephone Association, held at Harrisburg October 16 and 17, was the most successful in the history of the organization.

Among other important business, the association decided that all companies holding membership therein shall continue the low night rates, instead of following the lead of the Bell interests and making the night rates the same as those charged during the day. The association also adopted a resolution forbidding any member-company from purchasing equipment of any kind from the Western Electric Company, utterly rejecting the flag of truce in this direction recently held out by the Bell interests.

The convention decided to admit companies in New Jersey, Delaware and Maryland and to be known hereafter as the Eastern States Independent Telephone Association. This will make the new association represent 35 more companies and 30,000 more telephones than the old Pennsylvania association.

The work of the convention began at 10 o'clock the morning of the 17th. The last convention of the Pennsylvania association under its original name was appropriately held in the Capital City, where its birth occurred just three years ago.

Before the meeting of the association proper the executive committee met at the Commonwealth hotel. This committee was composed of C. W. Kline, Hazleton; C. E. Wilson and Edward Davis, Philadelphia; E. D. Schade, Johnstown; R. E. Umbel, Uniontown; W. B. Trask, Erie; G. B. Rudy, York; W. H. Denlinger, Patton, and J. G. Splane, of Pittsburg.

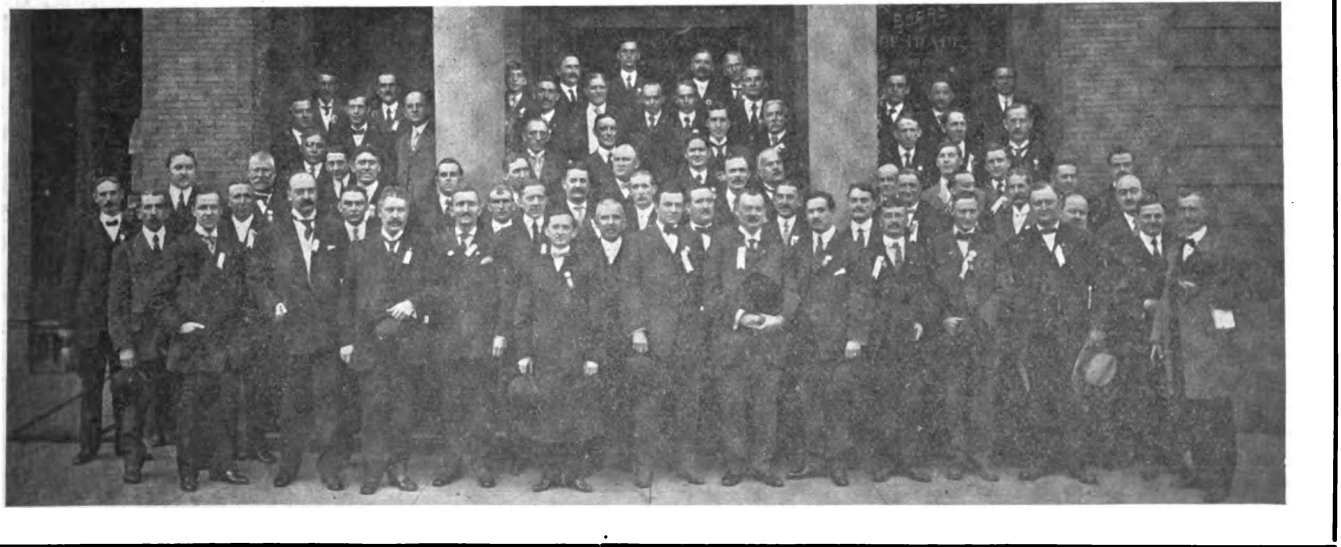
The first session of the convention was held at 2:30 o'clock that same afternoon, Charles West, of Allentown, the president, presiding.. First on the program was the address of welcome by Hon. E. Z. Gross, mayor of Harrisburg; he said in part:

"I believe in organization; I do not believe in monopolization. There was a day when Harrisburg suffered on account of monopolization in this particular line. The Independent company came in and relieved the situation, and to-day we can speak feelingly a word of welcome to those who have been instrumental in making it possible for our municipality to enjoy privileges that otherwise would have been impossible. A great many of our homes are furnished as a matter of necessity to-day with telephones that they did not feel they could afford prior to the introduction of Independent methods and Independent people. For that reason I come to-day with a glad heart and an open hand to extend to you the liberties of the city.

"I am glad you come now and did not come a number of years ago, when we were bound to the one company which stood in those days as the only one. Those were the old days when we were back numbers. Harrisburg was an old antiquated city in those days. To-day she has wakened up, and is abreast of the times. She gives the glad hand of welcome and the hearty co-operation of her Board of Trade to any worthy enterprise, and your enterprise is an absolute necessity to the general public."

Executive Committeeman Denlinger replied to Mayor Gross in a very pleasant address. A forceful portion of his address treated of some of the causes of success of the Independent companies represented at the convention. Among other things he said:

"The men here are interested financially in the telephone business. They have invested their money, and the money here represented to-day is Pennsylvania money—not that represented



Delegates to the Fourth Annual Convention of the Pennsylvania Independent Telephone Association, at Harrisburg.

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by the State of Massachusetts. We are here to-day to bear in mind this one thought, and it is one that I would like to emphasize, and emphasize most emphatically, that the local interests represented here should have some recognition throughout this great state. Every man here represents some particular locality. He himself has shown his confidence in this great movement by investing his own hard dollars in this enterprise, and such has been the success as to warrant a continued investment. I predict to you that when we come back here again, as we will, because we have been so royally received, instead of having 200,000 telephones in Pennsylvania, inside of five years we will have half a million."

Reports of officers were then received. The report of President Charles West contained a summary of the year's work. Mr. West referred to the successful efforts of the Association in preventing the passage of proposed legislation contrary to the interests of the members. Speaking of the Shield he said: "I am of the opinion that the use of a universal emblem such as the Shield will very largely benefit all of the operating companies, not only directly by getting additional long-distance business, but by identifying them as strong Independent telephone companies."

He also urged the advantages of membership in the International association, saying: "The International association is accomplishing a great deal of good for the Independent telephone industry all over the United States, and I cannot too strongly urge upon you the necessity of attending the annual convention of that association and getting in touch with its aims and purposes, which are similar to those of this association."

He urged the Independent companies to advertise their long distance facilities by a continuous and vigorous educational campaign.

The treasurer, C. E. Wilson, of Philadelphia, reported that the treasury is in good condition.

Some interesting figures were contained in the report of the secretary, H. E. Bradley, of Philadelphia. He said that in the last year the prosperity of the Independent companies has been general and steady. In the toll line business there was an increase of 20 per cent. over that of the previous year. There are now 200,000 Independent telephones in the State, 331 exchanges and 2,238 toll stations. Better and more toll lines are needed, he said, to effect better returns in the business.

The question of admitting to the association the companies of Delaware, New Jersey and Maryland was then brought up. F. A. Demarest, of Trenton, and C. E. Wilson, of Philadelphia, spoke for admitting them. There was some discussion, and the following committee was appointed by the president to consider the merger:

H. E. Bradley, Philadelphia; E. D. Schade, Johnstown; W. H. Denlinger, Patton. This committee reported favorably the following day and the report was unanimously adopted.

Districting the State and the consolidation of the Association and the Eastern Traffic Association were also discussed.

The following were appointed a committee on nominations: J. F. Stockwell, Philadelphia; W. P. Beardsley, Harrisburg, and G. B. Rudy, York.

Regarding the conciliatory attitude of the Western Electric Company, the association adopted a resolution that its members "will not purchase or use, nor connect with any company that does use, Bell telephones, switchboards or equipment made by the Western Electric Company and that any member so doing shall be immediately expelled from the Association."

The preamble to the resolution represented that the Western Electric Company, a subsidiary company of the American Telephone and Telegraph Company, had harassed the Independent telephone interests, and added: "The said Western Electric Company at the dictation of the American Telephone and Telegraph Company now offers to sell its wares outright to the Independent companies at cut prices with the object(if we may believe the press reports) of getting a footing with said companies so as to ultimately assist the American Telephone and Telegraph Company in disrupting the spirit of co-operation that exists between said companies through their State associations and the International association, and with the object of equipping such Independent companies as may buy from them with Bell apparatus so that they may eventually be connected with the Bell system. This move is only a stepping stone with that end in view."

Interesting papers were read by J. C. Kelsey, of Chicago, who discussed "The Value of Independent Telephone Securities as an Investment." T. B. Lee, of Washington, read a paper on "The Independents in Green and Washington Counties," and S. C. Thayer, of Rochester, read a paper on "What We Are Doing in Beaver Valley." Each of these papers was followed by a general discussion, in which many useful points were brought out, by the relation of the individual experiences of members of the Association.

The annual banquet of the Association was held in the Board of Trade auditorium Thursday evening. The arrangements had been made by W. P. Beardsley, W. Scarlett and W. L. Malin, from the Harrisburg offices of the American Union Telephone Company.

Two hundred covers were laid. Hon. B. F. Meyers, vice-president of the American Union Telephone Company, was toastmaster.

Two telegraph poles stood at either end of the stage, equipped with wires, cables, guys and all other equipment regularly seen on the highways. A screen of autumn foliage from the woods lent a realistic touch to the scene and also formed a screen for the orchestra. Pretty electrical effects were worked out in the design, chief of which was a blazing Shield. The "insulators" on the cross-arms were green incandescent lights. Whenever a speaker cracked an aged joke every light in the hall went out, a huge telephone bell rang loud and long and "Chestnut" blazed for an instant on a black background. The decorations were the work of C. E. Markle, foreman of the switchboard shop of the American Union.

The ices were served in miniature wall telephones, the boxes forming appropriate souvenirs. The table decorations were asters, roses and Boston ferns, with red carnations as boutonnieres.

Toasts were responded to as follows: Common and Preferred, Colonel J. L. Spangler; Our Legal Rights—What They are and What They Should Be, Hon. C. W. Kline, of Hazleton; and Nathan Forwell, of Philadelphia. A silent toast was drunk, standing, to W. D. Barnard, of Philadelphia, deceased, president of the old United Telephone and Telegraph Company.

F. D. Houck, general manager of the American Union Telephone Company, was elected president. Other officers elected are as follows:

First vice-president, C. E. Wilson, general manager of the Keystone Telephone Company, Philadelphia; second vice-president, J. G. Splane, president of the Pittsburg and Allegheny Telephone Company, Pittsburg; secretary, H. E. Bradley, secretary of the Eastern Traffic Association, Philadelphia; treasurer, Charles West, general manager of the Consolidated Telephone Companies of Pennsylvania, Allentown.

This will be Secretary Bradley's fourth year in office, he being the only man who has ever held that position.

The following were appointed delegates to the international association convention in Chicago next January:

C. E. Wilson, N. T. Folwell, J. F. Stockwell, Philadelphia; Charles West, Allentown; C. W. Kline, Hazleton; E. D. Schade, Charles Griffith, Johnstown; J. G. Splane, Frank Hart, Pittsburg; W. H. Denlinger, Patton, Cambria county; G. B. Rudy, York; W. H. Willson, F. D. Houck, W. L. Malin, Harrisburg, and T. B. Leo, Waynesburg.

OFFICIAL BULLETIN NO. 5 OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION.

Chicago Headquarters.—Arrangements have been made to remove the association headquarters to Monadnock building, Chicago, November 1. The transfer will be completed not later than November 10, after which date correspondence should be sent to the new address.

The 1908 Convention.—January 21, 22 and 23 have been selected

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as the dates of the next annual meeting, which will be held at the Coliseum in Chicago, in connection with the Electrical Show, the event of the year for the electrical industries. Exceptionally fine exhibits are being planned by the various telephone manufacturers and supply dealers, and in addition to these, all attending the convention will have an opportunity to view the splendid exhibits made by manufacturers of kindred lines of electrical apparatus, so that the exhibits alone will be a feature the up-to-date telephone man can hardly afford to miss. As the time selected is the most convenient possible for the majority of telephone men, the attendance promises to exceed that of last June, which broke all previous records.

There are many important matters to be considered at the January meeting and no efforts will be spared to arrange a programme that will be extremely interesting and helpful. Due attention will also be given to providing suitable entertainment. We want to make this convention an unqualified success in every way, and ask the hearty co-operation of all interested to that end. Do *your* part. Start now to boom the 1908 convention.

Convention Delegates.—State and provincial associations should arrange to select their delegates and alternates to the convention as soon as possible to avoid delay in preparing proper credentials. Blanks for reporting representatives selected may be obtained from the general office.

Suggestions Desired.—With a view of making the convention thoroughly representative, every one in the field is invited to send in suggestions for papers, discussions or special features, and officers of the various associations are requested to submit the names of their members who would make suitable timber for the various committees. Gentlemen, this is your convention; let us know your wishes.

Make Reservations Early.—Manufacturers and others desiring to exhibit at the Electrical Show during the convention will do well to give the matter early attention. Make all arrangements with Mr. Homer E. Niesz, manager, Electrical Trades Exposition Company, No. 464 Monadnock Building, Chicago.

Assessments.—Some associations have not yet paid anything on installments due on assessments. Remittance should be made promptly. Delay seriously hampers effective work being done by the association.

Publicity.—The establishment of this department is held up on account of finances, and until a man has been selected for handling publicity, the president will endeavor to carry on a certain amount of the work. All in the field are urged to give this department the assistance necessary to its success by responding promptly when called upon to furnish information for its use. If the Publicity Department can help you—remember, it is at your service.

Meetings.—Commendable activity is being displayed by quite a number of the State associations in arranging district meetings. Other States should give this matter immediate attention. It is very important; the progress of any association depends in a large measure upon the success of district meetings. A number of States have already decided the dates for their next annual meetings. Others should do so without delay, and, whenever possible, arrange to hold these meetings before the International Convention. The association will endeavor to have a representative at all State meetings.

Proper Accounting.—Every Independent telephone company should earn and pay dividends. If your company does not, there is something wrong. Find the leaks and stop them. Proper accounting will show you where and what they are. If your system of accounting needs revision, better give it attention now. Copy of standard forms may be obtained free from the Cleveland office.

Discontinuance Sale.—All stock of the Supply Department has been practically sold out, with the exception of a number of Colonial lanterns, some large transparencies and a few cuts of various sizes. Prices, which are just about factory cost, have been placed on these to move them quickly. If you are not supplied, better take advantage of this opportunity while it lasts. We desire to thank the Independent people throughout the country who have assisted us in closing out the Supply Department stock.

FINANCIAL STATEMENT, OCTOBER 15, 1907.

Apportionments by Executive Committee for 1907-08.

Associations.		
Arkansas	$100.00	
California	300.00	
Canada	25.00	
Illinois	750.00	
Indiana	1,000.00	
Iowa	700.00	
Kansas	400.00	
Kentucky	200.00	
Maine	25.00	
Michigan	750.00	
Missouri	500.00	
Nebraska	350.00	
New York	300.00	
North Carolina	25.00	
Ohio	1,300.00	
Oregon	40.00	
Pennsylvania	500.00	
Texas	100.00	
Vermont and New Hampshire	25.00	
Virginia	50.00	
Wisconsin	250.00	
West Virginia	250.00	
		$7,940.00
Contributions and pledges:		
Switchboard and Telephone Mfrs., Trade Mark Equipment Stamps	$6,500.00	
Supply dealers and jobbers	5,000.00	
Engineers	250.00	
Journals	250.00	
Operating companies	750.00	
Special	4,000.00	
		16,750.00
General:		
Honorary membership fees	$750.00	
Miscellaneous accounts	475.55	
		1,225.55
Total		$25,915.55
Paid in: June, $50; July, $235; September, $155; October, $2,120.05		2,560.05
Balance to be collected		$23,355.50

Annual assessment 1c. per unit. A unit is an operating telephone or a circuit mile of toll line. Assessments are payable monthly, and are based on number of units in respective associations at last convention.

Fiscal year, 1906-07, closed May 25.

Total receipts this year to date, including special committee balance		$15,673.20
Total expenditures, including accounts accrued before last convention		12,733.88
		$2,939.32
Accounts payable	$1,080.42	
Estimated expense for next thirty days	1,267.50	
		2,347.92
Surplus November 15		$591.40

ANOTHER EXAMPLE OF CLOSE TESTING ON NEW YORK CENTRAL RAILROAD'S TELEPHONE LINES.

THE possibilities of quickly locating and clearing trouble on long circuits with a Wheatstone bridge when the man in charge knows the conditions of his lines are very strikingly exemplified in a recent letter from S. L. Van Akin, Jr., Assistant Superintendent of Telegraph of the New York Central and Hudson River Railroad, which is as follows:

"On Friday, September 13, at 1:30 P. M., one side of our long distance telephone circuit became grounded between Syracuse and Canajoharie, a distance of eighty-eight miles, at which time we were unable to raise the only intermediate office, Frankfort, N. Y., for test. The ground was measured on the 88-mile stretch and instructions sent to linemen to clear it one-half mile east of Clarks Mills.

"After the location was arrived at we succeeded in getting a test with Frankfort which gave us a similar location on a stretch of fifty-seven miles with no intermediate test offices

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or test poles. The location was not over four hundred feet at variance from the position indicated by the measurement.

"The point I wish to bring out with regard to this is, that if we had not been able to measure it out closely the cause of trouble would have forever remained a mystery.

"Our inquiries to locate the section lineman in that territory revealed the fact that he was working at Clarks Mills, and it later developed that he had caused the trouble while stringing wire for a telegraph loop across the tracks to a new block station. While pulling them up he broke one of the wires, which fell on the bonded rails and, on account of frequent passing of trolley cars he was unable to get the wires up to clear until 2:40 P. M. Under the circumstances the lineman considered the interruption of such moment that he called the following day and volunteered an explanation, knowing that we 'had the goods on him.' This is to further exemplify the reliability of Wheatstone measurements on long lines."

Determining Rates for Large Telephone Exchanges*

By W. H. Crumb.

IN designing a telephone plant which will economically meet the requirements for future service it is necessary for the engineer to give careful consideration to the past and probable future growth in population of the city and of the past and probable future percentage of telephone development in the city. Charts Nos. 2 and 3 show the growth of population in the city of Chicago in the past and the estimated future growth. The population given by the United States census at the end of each decade is shown by the black dots on Chart No. 2; the open circles show the population given by the school census reports. The full curved line indicates the average growth of the city and illustrates the tremendous rate at which the city has been growing during the past decade and that there is no tendency toward a falling off in this growth. Curves A, B and C on Chart No. 3 show estimates of the city's future population as given by Mr. Bion J. Arnold in his report on the traction situation, starting with an assumption of 2,100,000 inhabitants in 1902. Curve D shows an estimate of future population made by City Statistician Grosser. Mr. Arnold's average curve (Curve B) and Mr. Grosser's curve cross each other at the year 1928, and the indication of the curves is that the population of the city will be not far from 5,000,000 inhabitants twenty years hence. Curve A is Mr. Arnold's minimum estimate and Curve C his maximum estimate of future growth in population of the city.

Mr. W. H. Crumb.

Chart No. 4 shows the way in which the area of the city of Chicago has been growing, from which it will be seen that from 1889 to 1899 the area of the city has increased practically twenty square miles, which is at the rate of two square miles per annum; and it is very probable that future additions to the area of the city may be expected from time to time during the next several years through the annexation of portions of present sections adjacent to the boundaries.

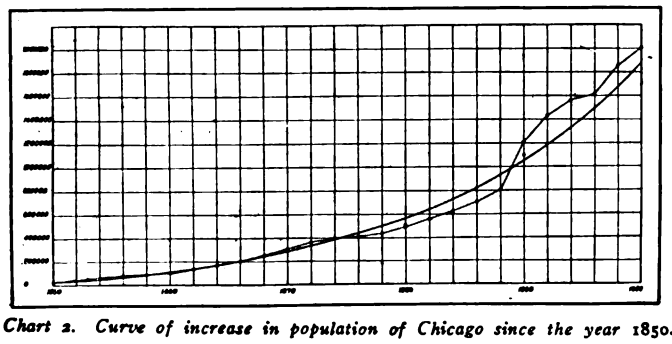

Chart 2. Curve of increase in population of Chicago since the year 1850.

Chart No. 5 shows the increase and percentage of telephone development in Chicago since 1894. By percentage of development is meant the number of telephones in use for each 100 inhabitants. It will be seen that this percentage has increased at a very rapid rate, and it is to be expected that this development will expand with improved and cheaper service until there are at least ten telephones to every 100 inhabitants and that the telephone development which should be planned on to occur in the city of Chicago at the end of the next twenty years should be made with a view to providing a system with as many as 500,000 telephones and perhaps 600,000 telephones. Four hundred thousand telephones is too low an estimate to be reasonable, especially in consideration of the fact that a first-class and cheaper service is likely to increase the percentage of development beyond 10 per cent., and may increase that development to a point where as many as fifteen telephones may be needed for each 100 inhabitants.

Chart No. 6 shows the change in the average price paid each

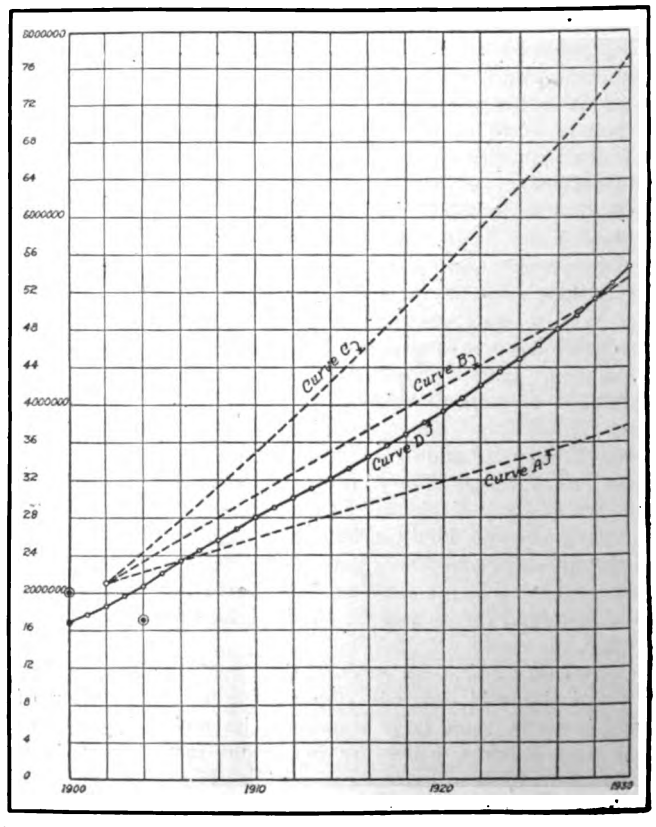

Chart 3. Curves representing estimates of different authorities for the future growth of Chicago.

*Abstract from a paper read at a meeting of the Western Society of Engineers, Chicago, continued.

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year per telephone and the average number of telephones in use during the year in the Chicago city exchanges for the past ten years.

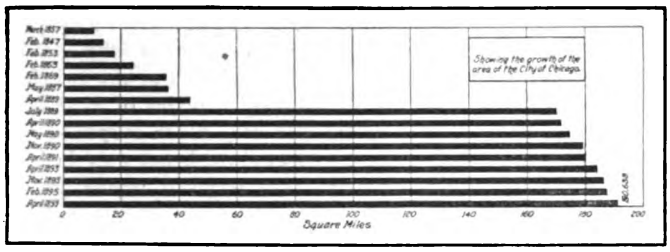

Chart No. 4. Relative lengths of horizontal heavy lines show rate at which city has grown in area.

Chart No. 7 shows the same information for the neighborhood exchange districts. These charts illustrate the way in which telephone development has heretofore increased as the price per telephone has decreased. A consideration of the manner of

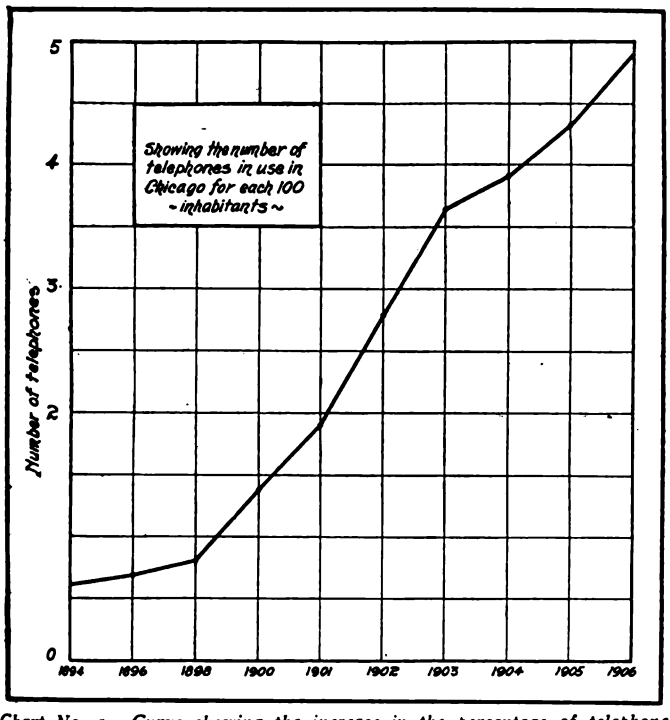

Chart No. 5. Curve showing the increase in the percentage of telephone development in Chicago since 1894.

charging must be made with due provision for the tremendous number of telephones that an operating company would be called upon to provide within a few years.

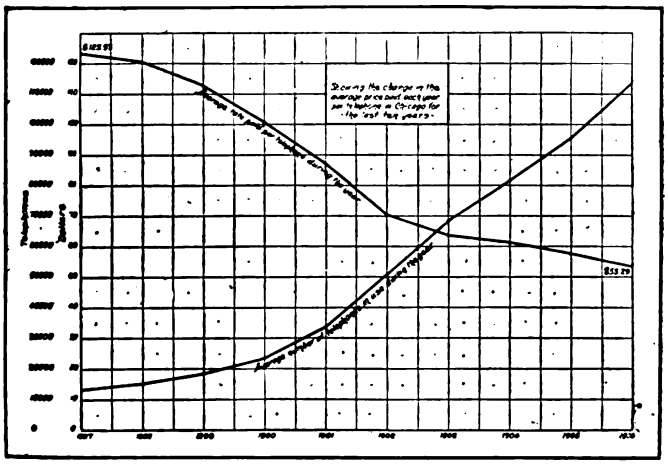

Chart No. 6. Curve showing rate of decrease in the amount paid per telephone each year, and rate of increase in the average number of telephones in use from 1897 to 1906.

Chart No. 8 shows the growth of the different classes of service since August, 1901. It will be observed that during this period measured rate telephones have increased in number very much more rapidly than the flat rate telephones, ten-party line telephones and private branch exchange telephones belonging to the measured rate class. The flat rate business and residence telephones have not increased in a very large degree. As is

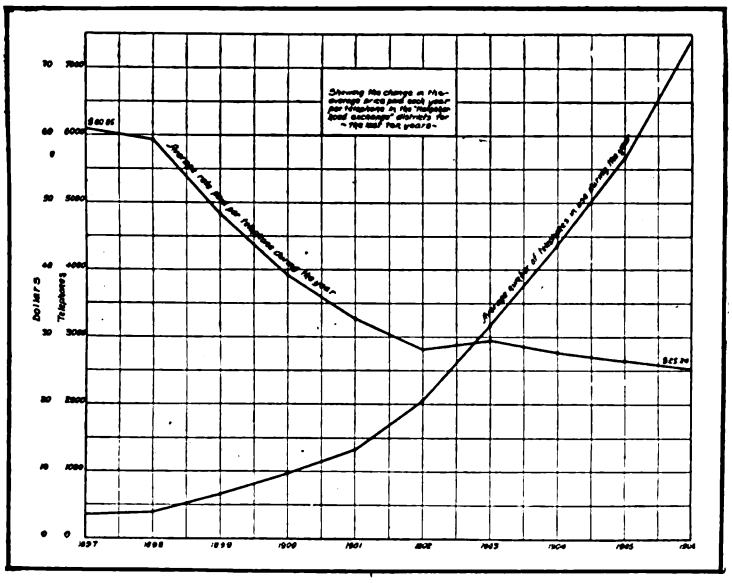

Chart No. 7. Curve showing for neighborhood exchanges the variations in average rates and the number of telephones in use during a year in the city of Chicago.

shown in this chart the great growth in the number of telephones operated by the Chicago Telephone Company has been due to the introduction of the measured service method of charging for

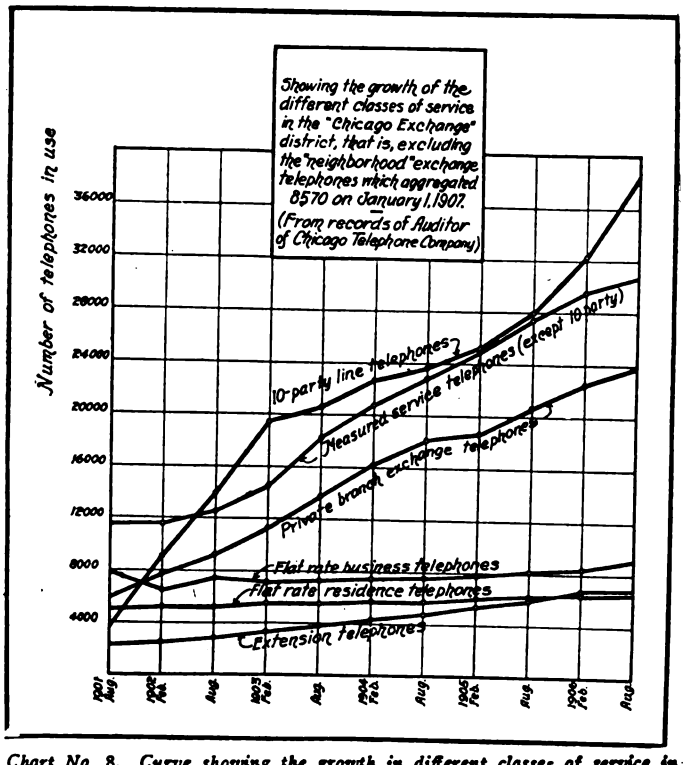

Chart No. 8. Curve showing the growth in different classes of service in the Chicago exchange district exclusive of neighborhood exchanges.

telephones. Chart No. 6 shows the decrease in the average price paid per telephone from 1897 to 1906, this average having decreased from $123.53 in 1897 to $53.29 in 1906. This decrease in average price was made possible by the introduction of the measured rate under which the operating and maintenance expenses are less than under the flat rate because the subscribers restrict the use of the telephone to their actual needs and the lower prices make it possible for people whose requirements for telephone service are limited to provide themselves with telephone facilities.

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The cost of operating a telephone plant is directly proportional to the traffic and not proportional to the number of telephones in service as is so often erroneously presumed. This error has been made by considering the telephone as the unit in the determination of costs instead of the message. In order to provide good telephone service good operating conditions should be maintained, which means that in addition to a well constructed plant the various subscribers should be provided with a suitable number of lines to fully meet the demands of their service. Under the flat rate method of charging subscribers, in order to economize in their telephone bills, often restrict themselves with regard to the facilities which they contract for, so that their lines are very much overloaded with traffic, thereby causing a large number of busy reports which are annoying to the subscriber and expensive to the company. If measured rate service is established the charge per message should be so made that the telephone company will receive a reasonable profit on its investment without overloading its lines with traffic and so that the subscribers can provide themselves, without additional cost per message, with additional facilities as their traffic increases beyond the fair working capacity of the lines they have contracted for.

A NOVEL ADVERTISING SCHEME.

SOME months ago, Mr. George H. Glass, general manager of the Citizens Telephone Company, of Pekin, Ill., in order to interest as many people as possible in his section of the state in the telephone service he is giving, started a guessing contest. The idea was that the three persons who could guess the nearest to the number of calls answered at the switchboard on two designated days should receive prizes of $5, $2.50 and $1.50, respectively. Mr. Glass was very much surprised to find that a great deal of interest was awakened, not only in his vicinity, but all over the country. He received replies from Iowa, Indiana, Ohio, North Carolina, Virginia, Pennsylvania, Wisconsin and New York. Altogether no less than 14,736 separate guesses were sent to his office. Of these 11,387 came from his own territory.

His experience with this method of advertising leads Mr. Glass to believe it is a most effective method of reaching the homes of the citizens, as it greatly interests the children, and makes them talk about it in such a way that the attention of everybody else in the family is attracted. Mr. Glass, in sizing up the scheme from a business standpoint, says that "it will bring much better returns than a second class solicitor."

The Maintenance of Toll Lines and Operation of Composite Circuits*

By N. C. Kissell.

INTERMEDIATE composite sets for "Morse" (telephones are never attempted) can be operated, as can also intermediate simplex sets, the latter for both "Morse" and telephone transmission. In Fig. 15 is shown a method of introducing an intermediate telegraph station on a composite circuit. Here an ordinary "Morse" set is inserted in series with the line wire, and bridged by a condenser of 4 M. F. capacity. The latter keeps the talking circuit from being opened when the key is opened. Across the relay is bridged a non-inductive shunt of about 1000 ohms. This will shunt some of the direct current out of the relay, but the proportion is very small. It is not the smallness

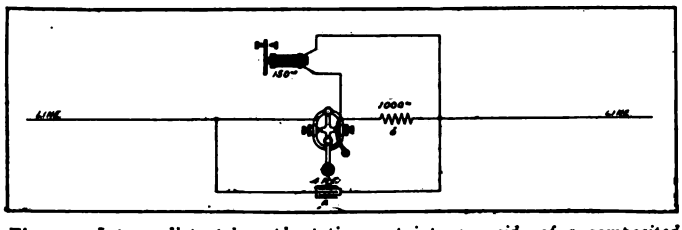

Fig. 15. Intermediate telegraph station, cut into one side of a composited toll line.

of the current which makes "Morse" working on the closed system difficult, provided the current is not reduced unduly, since a "Morse" relay can be adjusted to work very well on small current. It is rather the variation due to the line leakage which causes the trouble commonly experienced. The shunt is placed across the relay terminals for the purpose of providing a short path for the discharge or kick of the relay on opening the key. The high frequency current of the composite ringer will pass in preference through the shunt and condenser, instead of through the relay on account of the high inductance of the latter, and the consequent impedance to this current. If any should pass through the relay, it will be so small that it will not affect its armature, either against the retractile spring when no current is flowing in the "Morse" circuit, or against the magnetic effect of the direct current when it is flowing. The alternating talking currents will practically all pass through the condenser, whether the key is open or not. When the key is closed the condenser, *a*, is discharged through the relay and resistance *b* in parallel, and when it is open the condenser receives the full pressure of the direct current batteries, since it then forms the only obstacle to the "Morse" current. The condenser should therefore be able to withstand high pressures without breaking down. The discharge of this condenser will be beneficial, for the moment of closing the key, when the discharge takes place, is just the moment when the relay should respond to the signal. When the key is opened, all current is suddenly removed from the relay except for its own discharge through the resistance *b*, which in practice has no perceptible effect. The relay will therefore respond more sharply and decisively from the effect of the condenser and the effect of the condenser will be beneficial. The main purpose which the condenser serves, however, is that of keeping the talking circuit closed at all times. If an intermediate set is placed in one wire, a dummy set should be placed in the other wire at the same point. This is shown in Fig. 16. Here the condenser, non-inductive resistance and a pair of coils like those used in the "Morse" relay are connected in parallel, and inserted in the line wire at the point where the other set cuts in. This is done merely to maintain homogeneity in the two line wires, as when the key of the "Morse" set is open, the condenser in series with the line will give that side a higher apparent resistance than the other, throwing the talking circuit out of balance. As a whole, intermediate composite sets are not used much, as their action in practice somehow has not proven entirely satisfactory.

Intermediate simplex sets can be inserted successfully, either for "Morse" or telephone or both. Here again is demonstrated the flexibility of the simplex over the composite.

Figure 17 shows two methods of introducing an intermediate

Fig. 16. Arrangement of balancing coil and condenser, inserted in opposite side of line to compensate for arrangement similar to that shown in Fig. 15.

simplex set. The one shown at *A* consists of introducing a repeating coil in the line. Both windings of this coil are of equal resistance and the same number of turns. The "Morse" current

(Continued on page 276.)

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Questions on Theory and Practice

TESTING WITH DOUBLE SCALE VOLTMETER.—(933.)

As I have recently purchased a double reading Pignolet voltmeter and am not quite sure as to the best arrangement for the testing of my lines, I would be grateful for information through your columns. What I am particularly desirous of securing is a table of readings so that I would know immediatcly upon testing a line just how far out the trouble is on my toll and farm lines.

The low reading scale has a range of from 0 to 5 volts and the high scale indicates from 0 to 50 volts. F. H. S., Nebraska.

A circuit arrangement for testing your lines in the manner you desire with the voltmeter you have, and one which will work to good advantage, is shown in Fig. 933*a*. In this circuit the test plug is to be inserted in a jack connecting with a jack on the switchboard, into which the operator plugs up the line in trouble. Key No. 1 is for the purpose of throwing generator current on the line in order to ring the subscriber's telephone. Key No. 2 connects the line to an auxiliary talking set on your test table so that conversation may be held. Key No. 3 will cut the voltmeter in series with the line to be tested, so that you may be able to determine short circuits or opens in that way. Key No. 4 will throw one side of the voltmeter to ground, and the other side to the tip side of the line, so that should this side of the line be grounded the voltmeter will so indicate. Key No. 5 grounds the sleeve side of the line in the same way, so that the sleeve side may be tested for grounds also.

In making tests with the Pignolet voltmeter which you have, it will be necessary to consider the resistance of the windings of the armature for the two scales. The resistance of your low-wound winding of your armature, that is, the resistance of the winding of the armature for the 0 to 5 scale is 100 ohms, and the resistance of your high-wound winding of your armature for the 0 to 50 scale is 1,000 ohms. In using this voltmeter for testing resistance the readings obtained with various resistances will depend upon the resistance of your armature and the voltage of your battery. If you have a battery that will give you a reading on the voltmeter to the full swing of the scale on short circuit you may apply the formula as follows:

$$\frac{\text{Scale} - \text{reading}}{\text{Reading}} \times \text{res. of voltmeter},$$

which will give you the resistance of your line to and from the point of cross. This resistance divided by two will give you the resistance to the cross, which may be readily computed in feet by referring to Table 933*b*.

Were we positive that you would have a source of power the force of which would be constant at all times we could figure on a table for you such as you desire, but unless you use storage

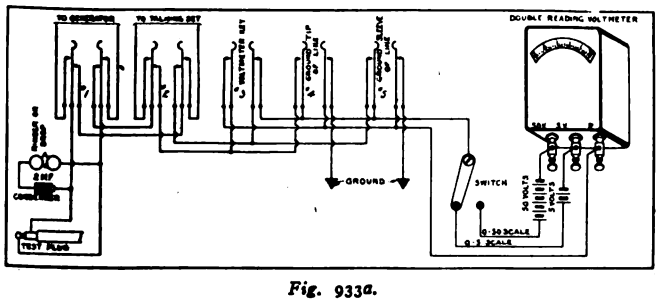

Fig. 933a.

battery we are afraid that your E. M. F. would vary somewhat, and therefore this first formula will not hold good.

Should you have a source of power that is apt to vary, such as dry cells or other primary batteries, you would then take your reading for resistance in the following way:

First take the reading of your battery on short circuit through the voltmeter, that is, cut your battery in series with the voltmeter only, and note the deflection. We will call this deflection *D*.

Then cutting your voltmeter and battery in series with the line take a reading. The reading we will call D^1, and the resistance of the voltmeter we will call *R*. Therefore the following formula will apply:

$$\frac{D \times R}{D^1} - R = Res.$$

For example: Your battery on the high reading scale on short circuit shows a reading of 30 volts. The battery cut in series with the line and the voltmeter shows a reading of 10 volts. Then applying the formula in which $D = 30$, $D^1 = 10$ and, the resistance of your voltmeter being 1000, then we have

$$\frac{30 \times 100}{10} - 1000 = 2000 \text{ ohms}$$

which gives you the resistance of your line to the cross and

No. B. W. G.	RES. PER MILE IN OHMS. B. B.	E. B. B.	Steel.
8	14.53	12.42	17.18
9	18.06	15.44	21.35
10	22.04	18.83	26.04
11	27.48	23.48	32.47
12	33.3	28.46	39.36
13	43.85	37.47	51.82
14	57.44	49.08	67.88
15	76.33	65.23	90.21
16	93.66	80.03	110.7

Table 933b.

back. Divide this by two and you would then have 1000 ohms, which equals the resistance of the line wire to the cross. Then by applying this to Table 933*b*, and noting the size of the wire, you can readily determine how far out from the office the cross is located.

Of course this test would apply only in cases where your line was crossed very solidly, and in which case no instruments were on the line between the point of the cross and the point at which the voltmeter test was made. One feature which is apt to lead to errors in measuring is that a perfect line in a magneto exchange will not measure open, as the ringer coils at the subscriber's instrument would cause the voltmeter to show a deflection. A little practice will usually give the operator on the test circuit an idea as to whether the deflection noticed is due to the resistance of the ringers or is caused on account of trouble on the line. This is especially so in the use of the low reading scale, in which the coils measure one hundred ohms only. In this case the perfect line would very likely give a deflection of over one volt, if the ringer coils are of 1600 ohms resistance, as is usually the case with bridged instruments.

In case no deflection is noticed it is at once indicated that the line is open. A loose connection would be shown by the needle of the instrument going to the measurement usually obtained when the ringers are across the line, and then falling to open measurement or to a point indicating very high resistance. If the trouble is caused by a ground on one or the other side of the line, it can be readily detected by throwing your keys Nos. 3 and 4, and testing out each side of the line separately. There is one point to be considered, however, in testing for grounds on a magneto system, and that is that the ringer movement is bridged across the line, and should one side be grounded a reading will be obtained indicating that both sides are grounded. In order to ascertain the side grounded in this instance, it would be necessary to open the line at the subscriber's station, preferably at the instrument binding posts, so as to leave the lightning arresters at the house included in the line under test. The arresters naturally are frequently the cause of lines being grounded. This would show whether both sides were grounded, or the reading for both sides was due to short circuit on the lines due to the ringer coils being bridged across.

In measuring resistances such as are usually found on telephone lines and around telephone exchanges it will be advisable to use the low reading scale of the voltmeter, having three or four cells of dry battery, and applying the second formula given.

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Editorial Comment

NOISES ON MAGNETO SYSTEMS.

THE best service that the common battery system has performed is, in all likelihood, the teaching of the important lesson that well insulated lines will give good transmission. Take any exchange you please which has recently been cut over from a magneto to a common battery switchboard, and canvass the old operators on the question of noisy lines. Then, if the records are well kept, look for trouble slips showing the relative numbers of complaints of "can't hear," or "can't be heard," for equal periods under both systems and, finally, ascertain the number of subscribers' stations which had to be wholly or partly rewired before the cut-over, and the number of line lamps burning when battery was first thrown on every line. The results of such an investigation will hardly fail to bring out facts which will make a common battery wire chief wonder how they ever were able to give service; and if they are mentioned to a superintendent of toll traffic who still has many magneto exchanges in his territory he will throw up his hands and start right in to tell about the troubles that go with his job. The fact is that in the absence of an automatic indicator of grounds and crosses, such as is furnished by every line lamp at a common battery exchange, the insulation on a large percentage of lines terminating in a magneto central office gradually gets into such condition as to be very objectionable from a service standpoint.

On local connections low insulation, unless it is very bad indeed, seldom causes serious difficulties. It often is a source of dissatisfaction to the subscriber on account of poor transmission, and is undoubtedly responsible, in the course of a year, for a considerable number of battery renewals unnecessarily made because the reason for poor transmission is not correctly assigned. It is in connection with toll business, however, that it shows up in the most objectionable manner. A leak across a line may have a resistance so high that it will not furnish a damaging shunt to voice currents when connected to another line of equal length; but let it be connected to a toll line of considerable resistance and a very substantial portion of the talking current from the subscriber's instrument never gets as far as the local exchange. Add to this the hum that is bound to occur in almost every instance where a toll line is connected to a wire which is grounded, even through a fairly large resistance, and the effect on the service becomes serious. No man is going to pay much attention to the argument that it is easier to talk than to write a letter if telephoning means to alternately repeat every sentence at the top of his voice and then strain at the receiver to catch from a jumble of sounds the words which seem to be no louder than a whisper.

There are a great many places in the country where magneto systems have been discredited on account of poor service. As a matter of fact, much of this feeling has been unwarranted. Ordinarily, telephone subscribers will not raise such a united storm of objections to turning the crank as to force a company to throw away good equipment. The point which should determine whether or not the magneto equipment should be discarded is properly one of economy of management rather than of improvement of service. If poor transmission is the cause of complaint and the magneto switchboard is in itself good for a considerable period of useful life, the place to apply the remedy is outside of the central office. Lines will finally have to be put in first class shape no matter what is done about the switchboard. The best time to make these repairs is now, when the improvements will help in a campaign for more toll business, and be likely to postpone a heavy investment in new central office equipment.

THE VALUE OF ODDS AND ENDS.

PROBABLY there is none of the little things that don't amount to much in connection with the operation of a telephone exchange which create more talk and disturbance than the scrap heap. If a man is careful, brings back all sort of odds and ends, takes the kinks out of old rubber-covered wire, polishes up woodwork, etc., he is as likely as not to have his attention called to the fact that he is after all only wasting the company's money. The time he puts into fussing with material that ought to have already paid for itself in service stands a fair chance of costing the company more than the future worth of the junk he works on. If one of the officials sees him at work on such a proposition, and is a man at all given to snap judgments, this is the side which will be very likely to appeal to him, with the result that he tells the man things which make him keep his scrap out of sight as long as he continues to work for the company.

The personal factor very often enters just as strongly on the other side of the proposition, too. If the general manager comes around in time to see a certain amount of material thrown away, or sold for junk, and has in mind a particular job where it could be used to advantage, he is going to ask the boys what they think they are paid for. They may be told that they are throwing away material that week which is worth a great deal more than their services to the company, and a few more truths that do not produce a pleasant feeling when spoken.

How to strike a happy medium and use up or dispose of the thousand and one loose ends of material to the financial advantage of the company is not so easy, after all. It seems to be a subject which can hardly be covered in an effective way by any system of detailed instructions. The details are, with most companies, so small that they do not by any means justify a highly-paid official in giving his attention to them. Economical use of such materials is made in a great many organizations, however, by letting the men into the spirit of a general plan for stopping leaks, so that each man will bear this point in mind every time he has an opportunity to apply it. When a man who is thoroughly familiar with telephone work handles old material, or left-overs he surely ought to be able to figure out some way to use it to advantage if there is any. He will do so, once he gets the habit. One of the principal reasons for the success of Independent companies is the ability of all employees, on account of their close association with the management, to realize that their efforts have a direct bearing on the prosperity of the company. This avoidance of the spirit of carelessness which fails to provide against unnecessary waste is one of the ways to make a common sense application of such knowledge which will be helpful.

GETTING READY FOR WINTER.

IF the men who make up the patent medicine almanacs should get out a special telephone edition we would see, in words spaced out to cover the next six weeks, the useful advice to "make ready for storms by strengthening your lines." Every summer there is a certain amount of deterioration of cross-arms, breakage of insulators, and general falling off in the condition of the outside plant, which remains unrepaired at this season. Much good work can be done by devoting some time to the tying up of lines that have become unfastened from the insulators, readjusting cross arm braces, replacing bad or weak arms with substantial ones, removing poles that show a lack of strength for the burdens that are likely to be put upon them by the snow, wind and sleet or suitably bracing and guying them, as well as many other features of construction which should be gone over at this time of the year. Everyone realizes what should be done, but is likely to be so busy with new work that the old has been more or less allowed to take care of itself.

When winter comes the first hard storm is likely to put in its worst work on these same weak spots. With transportation difficult, and the weather uncomfortable, the cost of repairs after such a storm takes a tremendous jump. It is surprising how little work a group of linemen will accomplish in a day under such conditions, as compared with the amount they will do at the present time.

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In a Legal Way

CONDUCTED BY A. H. McMILLAN.

LABOR LIEN ON TELEPHONE LINE.

Does a mechanic's lien attach to a telephone line in the State of Florida for labor and materials furnished the company?

A dealer, who furnished some machinery now claims a lien upon it for his labor and the value of the engine. We are willing to pay him what his labor and machine is worth, but no more. If there is such a lien given by law, does it give the party claiming it any authority to help himself to the company's property? A prompt reply will greatly oblige. B. & R.

A LIEN is given by law in Florida upon any telephone line for labor furnished in erecting or fitting it out. A similar lien exists for machinery and other articles furnished in connection with the construction of the telephone system. This does not give the person claiming the lien a right to take the property without legal proceedings. He can only enforce the lien at the end of a law suit. Rev. Sts. of Florida 1892, Sev. 1727, 1737.

TOLL LINE CONTRACT NOT IN WRITING.

AT Lowville, N. Y., the Black River Telephone Company of Lowville caused to be served upon the Northwestern Telephone and Telegraph Company of Carthage an order restraining the latter company from interfering with or disconnecting the line or lines of the Black River Telephone Company from the line or lines of the Northwestern Telephone and Telegraph Company where they are now joined one to the other at Deer River in the county of Lewis, or from refusing to receive and transmit messages from the Black River Telephone Company over the line or lines of the Northwestern Telephone and Telegraph Company.

The service of the order grew out of a contract entered into between the Northwestern Telephone and Telegraph Company and the Central New York Telephone and Telegraph Company of Utica, whereby it was agreed that the former should, on October 1, 1907, sever all connection with the Black River Telephone Company.

When the Black River Telephone Company constructed its lines to Deer River, it was met at that place by the Northwestern Telephone and Telegraph Company, thus giving service to Carthage and the North. While there has been no written contract between the two companies, there is an agreement in the form of a proposition in writing by the Black River Telephone Company, which was accepted by the Northwestern Telephone and Telegraph Company, whereby the companies forwarded each other's messages at an agreed tariff, settlements being had at stated periods. In this agreement it was provided that neither company should sever the connection without 30 days' previous notice to the other. This notice the Northwestern Telephone and Telegraph Company has not given.

SERVICE TO TWO FIRMS FOR ONE RENTAL.

We are looking for information as to whether or not we are compelled to give two firms in the same office service over the same telephone for one monthly rental. C. C. Co.

YOU are not required to give two firms in one office service for one monthly rental. One firm becomes the subscriber, and it alone is entitled to the use of the telephone. If an additional firm desires to use the telephone and takes advantage of your service, it must pay an additional charge, because it puts an additional burden of care, wear and expense upon your company.

RESERVATION CREATING A MONOPOLY IS VOID.

AT Houston Heights, Texas, O. M. Carter brought suit to enjoin H. N. Jones from constructing or operating upon any of the streets or alleys of the city electric light poles, wires or other fixtures. Jones had been granted a franchise from the city council authorizing him to construct and operate an electric light plant in the city. Carter's grantor and another had at one time been owners of the land of which the city now forms a part. In platting and conveying to the city land for streets, alleys and public grounds, the grantors inserted reservations in their deeds of the exclusive right to use the streets for the operation of street railroads, and for the maintenance of lighting appliances, sewers, gas, water works and telephone lines, free from the city's control. This exclusive right was assailed as void because against public policy, in that it would establish a monopoly.

The plaintiff advanced the proposition that the terms "monopoly" as used in the state constitution meant the license or privilege allowed by some sovereign authority for the sale, buying, selling or manufacturing of some article or commodity, whereby the subjects are restrained of the liberty that they heretofore had, with respect to the matter affected by the franchise. The court, while admitting the correctness of this definition, asserted that it was not broad enough in its scope.

The court defined the term as follows: A monopoly not only includes an exclusive right granted by the state to a few of some right thing which was before of common right, but embraces any combination or contract, the tendency of which is to prevent competition in a broad and general sense and control prices to the detriment of the public, regardless of the form assumed.

The court held that the reservations in the deeds were inconsistent with the use of the streets and void, because they created a monopoly over the city's most important interest. Jones vs. Carter, 101 S. W. 514.

PAYMENT UNDER PROTEST MUST BE INVOLUNTARY.

THE decision of Judge Holdom, at Chicago, in the suit of the Illinois Glass Company against the Chicago Telephone Company that recovery of excessive charges cannot be made at law has been affirmed by the branch Appellate Court. In his decision Judge Holdom said that the plaintiff had sufficient remedy in proceedings in chancery. At present Judge Mack has under advisement a suit brought by several hundred complainants against the Chicago Telephone Company, in which an accounting is asked. The decision of the upper court in the Illinois Glass Company's law suit is not believed to affect the suits in Judge Mack's court.

The Appellate Court declares that the plea of the plaintiff that payment over the annual $125 rate was made under duress is not proved. In its opinion it cites a case in which an insurance company paid 2 per cent. of its premiums of the preceding year to the superintendent of insurance under a statute which later was declared to be unconstitutional. The company then began suit to recover the payments. The Court says:

"In the case of the insurance company it was not shown that the plaintiff claimed or knew that the demand was unlawful, or was unwilling to pay it, or was influenced to pay the same by reason of the possible consequence of refusal to pay, and it was held that the payment was voluntary and could not be recovered."

UNLIMITED GRANT AT VERMILLION, S. D.

AT Vermillion, S. D., the Northwestern Telephone Company has been ordered by the city council to remove its poles and lines from the city's streets within sixty days. The difficulty between the city and the company is the refusal of the latter to accept a franchise proposed by the city council which demands an annual license of 3 per cent. of the gross earnings of the city exchange and the reduction in charges on private lines from $1.50 to $1.25 per month.

The company has now discovered that the privilege granted the company years ago for setting poles did not cover any specified period, but simply gave the company the right to occupy public highways with poles and lines. As this grant is unlimited, the company contends it cannot be ousted from the streets by any means.

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From the Telephone Exchanges

PASADENA'S DEMANDS THAT BELL COMPANY SHALL OBTAIN A FRANCHISE STILL UNSETTLED.

NEGOTIATIONS are still in progress between the Pasadena, Cal., City Council and the Sunset Telephone Company, a branch of the Pacific (Bell) concern, over the refusal of the company to seek a license or franchise in any shape. The attorney for the Sunset company has had several conferences with the members of the Council and the Mayor, but all parties concerned refuse to disclose any facts regarding the case except to say they are well pleased with the results of the conferences.

It appears that both the city and the company are sparring against time. Should the Pomona, Cal., case, which involves substantially the contentions in this city, be decided for the company, it will continue to operate its lines in Pasadena under its State charter and refuse to take out a franchise.

The company attorney said many nice things about Pasadena, and the Mayor informed him that the city only wanted the company to do what was fair in the matter, but all concerned know that the matter will be settled when the Pomona case is decided by the courts. A decision is expected about the middle of October.

Meanwhile the Council has passed an ordinance instructing the street superintendent to remove the company's poles and wires from the city streets, unless the company can show a city license to maintain them. The resolution is drastic and direct, but all parties to the controversy seem to understand there will be no definite steps taken until after the decision of the Pomona court. It is hardly likely that the city will take the responsibility of removing the poles and wires of the company and assess the cost to it under existing circumstances.

On the other hand the city attorney is convinced that the city has the right to demand payment for its franchise and to regulate the telephone company in the transaction of its business, and when the time comes he will take such steps as will protect the city's rights. I can be stated that should the city of Pomona win its case against the telephone company the city franchise will not be given for a song, but a fair and just price will be demanded.

It has been suggested among councilmen that the franchise should contain a clause by which the company should pay the city $1.00 per year per telephone actually rented to subscribers and that suitable regulations should be recognized for the control of the city over the plant so that the wires may be ordered underground if the council sees fit to have them so placed.

TEXAS CITIES MAY HAVE FREE TELEPHONES.

THE Attorney-General of Texas has advised the city attorneys of both Dallas and Austin that the anti-pass law does not prevent telephone companies from performing their franchise contracts which require companies to furnish a certain number of telephones to the city free. The ruling will also apply to the City of El Paso.

CITY OF VICKSBURG COMPELS TELEPHONE COMPANY TO PUT WIRES UNDERGROUND IN RETALIATION FOR WITHDRAWAL OF FIRE ALARM SERVICE.

THE Cumberland Telephone Company has been compelled by the City Council of Vicksburg, Miss., to lay its wires underground in the fire district. This requirement is said to have grown out of a dispute over the fire-alarm system maintained by the company, which it withdrew because the City Council refused to absolve the company from damage suits growing out of the negligence of operators. As a result, the city has been compelled to rely upon a voluntary service, alarms being now sent in by telephone to a central engine house.

The direct cause of the trouble was a suit against the Cumberland by a Louisville fire insurance company involving a $27,000 loss over a fire caused by an alleged mistake of an operator in transmitting an alarm. The telephone company contends that it was merely a spirit of retaliation that prompted the council to require it to place its wires below the surface.

TROUBLE BREWING FOR BELL AT ROANOKE, VA.

THROUGHOUT the city of Roanoke, Va., considerable complaint has been expressed in relation to the contracts of the Virginia and Tennessee Telephone Company, lately become a Bell sub-licensee for party line service.

These contracts differ materially from the stipulations embodied in the franchise granted to the company, in which the party line phase of telephone service is specifically dealt with. The result is that the company is securing no signers to the contract forms submitted. The Merchants' Association some time ago took the matter in hand with the intention of bringing the matter before the grand jury and compelling a compliance with the terms of the franchise on the penalty of having it revoked if the compliance is not forthcoming.

HEALTHY INCREASE IN EARNINGS REPORTED BY INDEPENDENT TELEPHONE COMPANY OF LAFAYETTE, IND.

O. B. FRIBERG, secretary of the Lafayette Telephone Company, Lafayette, Ind., in his annual report to the stockholders was able to present figures showing that the earnings have greatly increased and that more than two hundred telephones have been added to the system during the past year. Very important improvements have been made at an expenditure of over $150,000, so that the plant is now worth approximately half a million dollars. A new exchange building is almost completed and the switchboard is already being installed. New telephones are soon to be put in place and the stockholders are convinced that their new plant, when put in operation, will be one of the most complete and satisfactory in the State of Indiana.

The stockholders after a thorough examination of the exchange building and an inspection of a portion of the outside plant returned to join in a very enthusiastic meeting, presided over by President William Horn. President William Horn and O. B. Friberg, secretary of the company, were re-elected and Will R. Wood was chosen to serve as a new member of the Board of Directors of the company.

A TELEPHONE SUBSCRIBER WHO KEEPS POSTED ON TELEPHONE MATTERS BY READING AMERICAN TELEPHONE JOURNAL; SOME OF HIS IDEAS ABOUT THE SERVICE.

F. A. THOMPSON, who owns a fruit farm and conducts other business at Coyle, Okla., although he says he has nothing more to do with the telephone than to pay his monthly dues, and try and get his money's worth, endeavors to keep posted on the latest improvements affecting the service he receives by reading AMERICAN TELEPHONE JOURNAL regularly. Telephone managers will be interested in some of his ideas, which will show them how the right kind of a subscriber looks at the telephone manager's job, and is willing to help him to make it easier if he can.

Mr. Thompson seems to have a very sound appreciation of the difficulties involved in keeping a telephone line running smoothly, and he thinks it might be of some use to take the subscribers into the company's confidence to a certain extent, and tell them its troubles. He says: "Let some one write a concise but clear statement and explanation of the company's troubles, and have it made into plate form, so any company can get it cheaply. Then let every company devote a page of its directory to that plate. You know that it is quite natural to sympathize with those in trouble, especially if we understand the nature of the case, and I think the average subscriber would be inclined to shed a few sympathetic tears for the distracted man-

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From the Telephone Exchanges

ager, whose hair is turning prematurely and whose nervous system is fast becoming a wreck, through everlastingly trying to make both ends meet, and keep everything running smoothly. Take us into your confidence, Mr. Telephone Man, and instead of making yours a rocky road to travel we may help to smooth out your path, and even throw a few roses along your way." This is a pretty good idea for a subscriber, and we should like to know what telephone men think of it.

Another suggestion from Mr. Thompson is that a manager of rural lines should select a bright farmer boy on each line, and have him come to the central office to be taught all that the troubleman can tell him about the right things to do when a line gets out of condition. He thinks that by training somebody on each line to go out and look for open wires, crosses, grounds and such faults, the telephone company could save both time and money. Rural delivery will furnish a means of keeping in communication with the amateur electrician out on the line. Letters can be used to advantage and still save a lot of time when conditions are such that if the local assistant were not able to look after such matters the company would be obliged to wait for two or three days, or perhaps more, before it could send its regular man out to clear things up.

BURLINGTON, IOWA, SOON TO BE RECEIVING SERVICE FROM REBUILT INDEPENDENT SYSTEM.

BY January 1st, 1908, so states Superintendent W. B. Burke, of the Mississippi Valley Telephone Company, the Independent plant at Burlington, Ia., will be thoroughly reconstructed and subscribers will be receiving the best of service from it. The new switchboard is now on hand, and is being erected in the building purchased a year ago. Conduits have been built, and cable is now on the way and will be drawn into them and spliced up in a very few days. The new switchboard, which has recently arrived and is now being set up, has an ultimate capacity of 5,550 lines, and equipment is being installed for 3,600 lines. Apparatus will be installed for handling five hundred rural telephones in addition to the lines in the city.

Arrangements have been made for handling the considerable amount of toll business which this company has, and which it expects to increase when its new office is cut into service. The company is devoting its entire attention to the work of rebuilding the Burlington plant, now that the Keokuk exchange has been put into first class condition, and expects to largely increase its business as soon as it is ready to handle additional contracts.

BEES MAKE NEW KIND OF TROUBLE FOR BELL COMPANY IN NEW YORK.

EXCUSES to express the discontent felt by subscribers of the Bell telephone company in central New York, since that organization has started its campaign to raise rates, are being sought on every side by subscribers. The most interesting and novel complaint recorded up to date is that of a farmer living near Carthage, who demanded that a considerable number of lines strung near his house should be removed. When pressed for a reason, he stated that his greatest source of income was the sale of honey gathered by bees which he kept near his farm house. These were accustomed to fly across the telephone company's right of way to a buckwheat field, and the farmer said that thousands of them were killed by striking the telephone wires. He threatens to enter suit if the wires are not removed.

INTER-OCEAN TELEPHONE & TELEGRAPH CO.,
Corning, New York.

American Telephone Journal,
100 *William Street, New York.*

Gentlemen:—

In your recent letter I believe you urged to my attention the merits of the JOURNAL. *Now I've taken that paper ever since I've been in this business—couldn't get along without it—to it I attribute my success and it serves to cheer me in the frequent periods when I would otherwise be morose.*

I congratulate you on the quality of your JOURNAL.

Cheerfully yours,

F. A. KLOCK,
MANAGER.

A members of our staff tried to tell his friend, Mr. Klock, something about the JOURNAL, *but learned some very pleasant news, as shown in the above letter.*

INDEPENDENT LONG DISTANCE COMPANY IN ARKANSAS, RECENTLY REORGANIZED, IS READY TO START WORK.

THE Telegraphone Company of Arkansas has changed its name to the Long Distance Telephone Co. and opened an office in Little Rock. The company is now ready to proceed with the plans which have been under discussion for some time, with the object of knitting together the various Independent companies of the State by a unified and well engineered system of toll lines.

Plans have been drawn up for all the initial work, and material has already been ordered. It is understood that all construction is to be strictly high grade. All poles which have been ordered will be creosoted to resist the influences liable to cause decay.

The new officers of the company are W. D. Hearn, president, Pine Bluff; A. E. Boqua, vice-president, Fort Smith; Chas. F. Speed, secretary, Texarkana, and E. R. Wynn, treasurer, Bald Knob.

DETROIT HOME TELEPHONE CO. WILL OPEN SCHOOL OF INSTRUCTION.

J P. BOYLAN, manager of the Traffic Department of the Home Telephone Co. of Detroit, Mich., has just organized and opened a school of instruction for the company's employees. A comprehensive plan of telephonic education has been worked out, and talks are to be given by the men who will have charge of all the various departments of the company.

KALAMAZOO INDEPENDENT TELEPHONE SYSTEM WILL BE BUILT AT ONCE.

ORGANIZERS of the Kalamazoo Home Telephone Co. of Kalamazoo, Mich., which was recently incorporated, say that they will be giving service from a first class modern plant in the early part of next summer. Plans are already drawn, it is reported, for a system having an ultimate capacity of 7,000 telephones with 3,000 lines equipped. The new company is capitalized at $500,000, of which $100,000 is common stock and the balance preferred.

CUMBERLAND COMPANY MODIFIES CHARGE FOR COUNTY SERVICE UNDER PRESSURE OF MISSISSIPPI RAILROAD COMMISSION.

AT the last meeting of officials of the Cumberland Tel. & Telg. Co. with the Mississippi Railroad Commission, at Jackson, Miss., the telephone company receded from the position it had previously taken, and agreed to modify, for exchanges not widely separated in the same county, the charge of 10 cents per call when a subscriber is talking from another system than his own. The compromise measure adopted was that the rate for a distance of 10 miles and under should be 5 cents; while over 10 miles, the charge would be 10 cents, which, under a recent ruling of the company, was the charge for all three-minute calls.

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THE MAINTENANCE OF TOLL LINES AND OPERATION OF COMPOSITE CIRCUITS.

(*Concluded from page 270.*)

divides equally through the two halves of the windings and the alternating talking currents are repeated either way by the action of the coil. This method introduces a third repeater in the circuit which is undesirable for reasons stated in the description of the simplex circuit, and not only will there be a loss of talking current, but difficulty will be experienced in ringing through the three coils in the whole circuit on account of the low frequency of the ringing generator.

A better method is shown at *B*. Here the line is broken through two condensers of 4 M. F. each. Across the line are bridged two impedance coils from the centers of which taps to

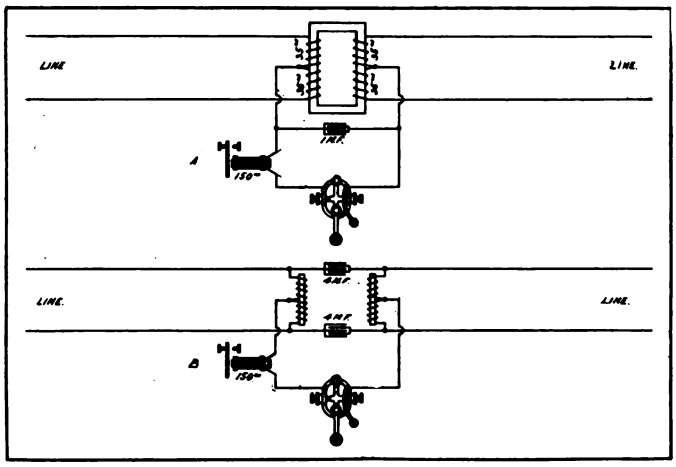

Fig. 17. Two methods of introducing an intermediate telegraph set in simplexed telephone line.

the telegraph sets are taken out. These coils should have a resistance of about 1000 ohms, and having a high impedance will choke back any of the high frequency talking current that would tend to pass through them. The "Morse" current divides through the coils in opposite directions, each half being equal in resistance and number of turns of wire. This will keep the iron cores from being magnetized by the "Morse" current, as the magnetizing force of the current in one half of the windings is neutralized by the current in the other half. These coils will therefore offer no impedance to the "Morse" current except that due to the straight resistance of the wire in their windings, but will offer a very high impedance to the talking currents. When the key is open the condensers will receive the full pressure of the "Morse" batteries and must be able to stand this. When the key is closed the condensers will discharge through the relay in multiple, thereby quickening its action. It will be seen the loss in transmission in this circuit will be less, as the condensers being of high capacity offer very little impedance to high frequency currents, and also no difficulty will be experienced in ringing on this circuit. A telephone station can also be bridged across the line at this point, as the telegraph current divides equally over both wires, producing no difference of potential across them. Instead of a straight telegraph set being inserted, a telegraph repeater could be inserted, and the other side of the repeater could be connected to another straight telegraph wire, thereby connecting a grounded telegraph circuit to a simplex.

The value of simultaneous operation is not only in the increased revenue derived from leasing "Morse" wires, but is also due to the fact that the telegraph can be used to take the load off the telephone circuits, as, for example, in ticket passing between operators. The time the wires are in use for this purpose is considerable, and no revenue is derived as the subscriber only pays for the actual time he is in communication with his party, and not for the time consumed in getting his party. For instance, if a company has two circuits between two points, with arrangements for simultaneous telegraphic operation, the only time these are in use is when there are conversations going on which are paid for. The two circuits can be phantomed, and the phantom used as a two way order wire, over which tickets can be passed and all business between the two operators carried on, thereby keeping the physical circuits free. Fig. 18 shows such an arrangement. When either operator presses the button, she opens a closed circuit through the "Morse" relays, which connect both the operators' sets (which are normally disconnected) to the phantom order wire. The operation of this circuit will be clear by an inspection of the drawing. The contacts on the telegraph relay are reversed, making contact upon the relay opening instead of closing. In some parts of the country ticket passing and all engagements between parties are done by "Morse," thereby keeping the lines cleared for paid business.

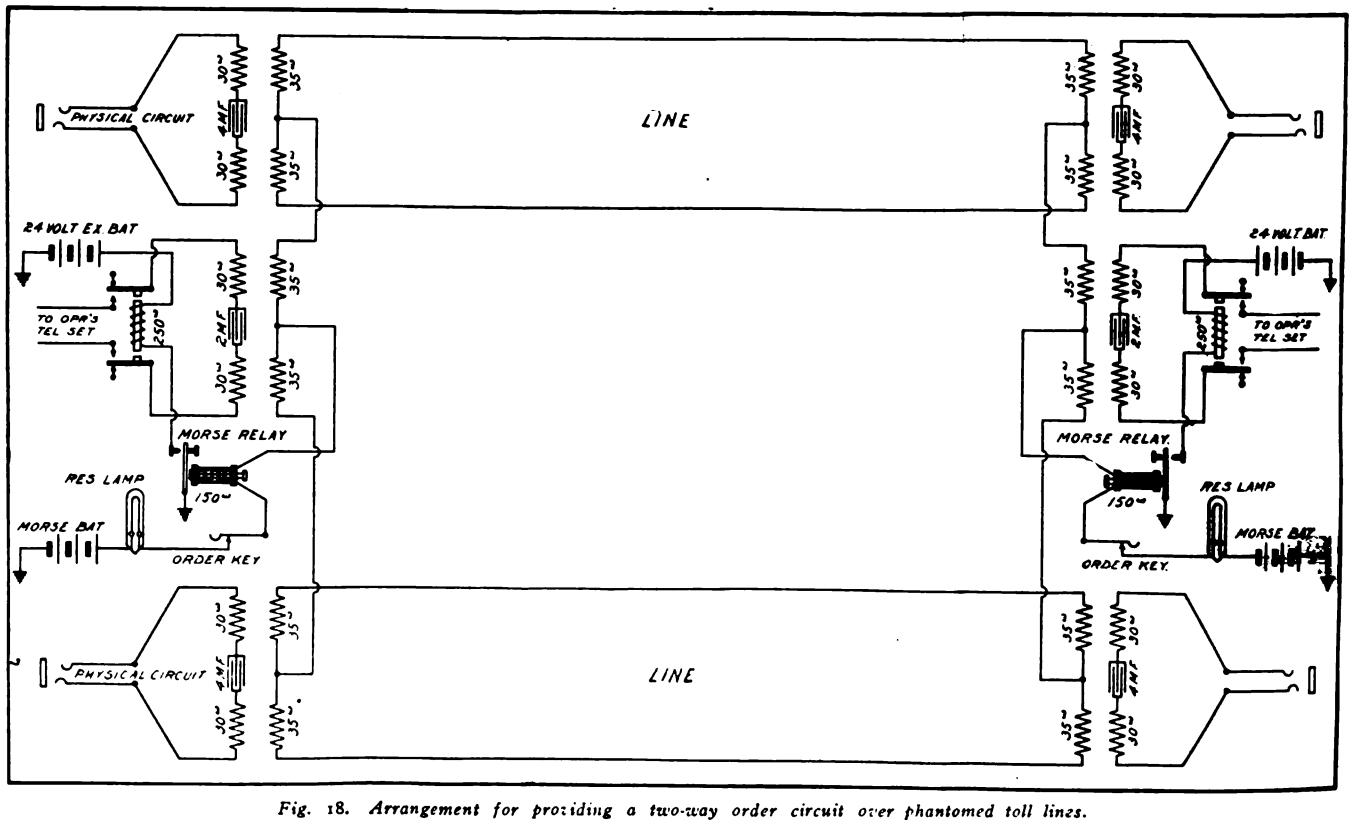

Fig. 18. Arrangement for providing a two-way order circuit over phantomed toll lines.

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165,000 of our Stations in use is our Best Indorsement.

They are Automatic—no Levers or Springs.

GRAY TEL. PAY STATION CO.

HARTFORD, CONN.

We send Catalogue on request.

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—200 magneto telephones. Have changed system to common battery, therefore must sell these telephones at once very cheap. Oswego Co. Independent Telephone Co., Fulton, N. Y. 949

FOR SALE, dirt cheap, 100 series 'phones, with Ericsson transmitters, Holtzer-Cabot generators and oak cabinets. Good as new. Address, R. Valentine, Janesville, Wis. 848

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

STEADY POSITION.—A young man wanted to take charge of small magneto exchange. Must be able to do line and instrument work, also collecting. One who is not afraid to work. Best of reference required. No boozers wanted. Address O. A. Cole, Princeton, Ill., Bureau Co. 950

WANTED.—Position in Engineering or Switchboard department by technical and practical young man. Single and can furnish best of references. American or foreign service. Address Box 951, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 951

DO you want as Manager or Superintendent reliable, energetic and experienced man, willing to take stock as part of salary. If so, address, Box 952, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 952

SUPPLIES WANTED.—A Warner Pole Changer. Must be in good condition and cheap. Nappannee Telephone Co., Nappannee, Ind. 953

WANTED—A position with a progressive Independent Telephone Company located in the South or Southwest. Have had 18 years' experience and at present have charge of three large central energy plants. Married, 35 years of age, and am an experienced organizer and systematizer. Address Box 954, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 954

WANTED—Positions desired by two first class telephone engineers who are experienced installers of switchboards, underground and aerial systems. At present employed as general and assistant general superintendents. Both are desirous of locating in the South or Southwest. Address Box 955, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 955

WANTED—By a large rubber manufacturer going into the manufacture of rubber covered wire on a large scale a competent man, thoroughly informed, to act as sales manager of wire department and sell the output. We have a competent manufacturing man, whom we desire to support with the best selling man in the trade. The Diamond Rubber Co., Akron, Ohio. 956

WANTED—High class salesman, thoroughly informed on hard rubber in all its branches. Factory capable of turning out the best of product. All inquiries confidential. The Diamond Rubber Co., Akron, Ohio. 957

CABLE SPLICER wants position. Several years' experience in Telephone, Telegraph and Power Work. Best of references. South or West U. S. preferred. State wages, etc. Address Box 942, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 942

WANTED—Position. Thirty-three years of age, with 4 years' technical training; 7 years' practical experience, from hole digging to Long Distance Construction, Exchange Installation and Management. Address Box 943, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 943

WANTED—Position as manager in large town. Thoroughly experienced in all branches. Now managing up-to-date common battery exchange. Good reasons for changing. Age 27; married, temperate; good references. Address Box 944, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 944

WANTED—$5,000, 5 to 10 years' time, 6 per cent. interest. Interest payable annually or semi-annually. Security gilt-edge. Address Box 945, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 945

WANTED—Position by competent young man as manager or superintendent of telephone exchange, not over eight hundred subscribers. Six years' experience. Good habits; best reference furnished. Address, Box 946, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 946

CAN place one or two cable splicers. $3.50. Will be permanent to competent party. Write fully. Address Box 947, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 947

WANTED—First class cable spiicer by company operating in Eastern state. State references and salary in application. Address Box 958, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 958

WANTED—Wire chief for exchange in Eastern state, who can produce results. One with experience on Strowger Automatic system preferred. State references and salary expected. Address Box 959, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 959

WANTED.—Two or three good telephone men for troublemen or managers of magneto exchanges of 100 to 300 subscribers. Wages $30 to $50 per month. State experience and give reference. S. H. Young, Sparta, Tenn. 934

SECURITY CAN TOPS

have distinct and decided advantages over others. Their compactness, convenience, simplicity of design, accessibility and lightness make them appeal to you.

Add to this their low price and you have some of the reasons for their popularity.

Ask for Booklet Number Three. It tells more.

THE F. BISSELL COMPANY, TOLEDO, O.

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What the Manufacturers Are Doing

A NEW FAULT FINDER.

THE extensive development in recent years of the telephone industry has necessitated a parallel development of numerous classes of apparatus and industries subservient to the growing needs of telephone companies. The hiding underground of large quantities of wires in lead encased cables, while greatly decreasing the number of troubles likely to arise, has necessitated the invention of simplified forms of accurate fault locating apparatus in order to lower the cost of clearing each individual trouble.

The cables are cared for, very often, by men who have had little leisure or opportunity for education in the schools where the manipulation of algebraic symbols is taught. These are the men, however, who must promptly and accurately spot the troubles that occur in underground cables, and they must do this with a minimum of cost to the telephone companies and with the least delay in the telephone service.

To meet the increasing demand for locating apparatus, to be placed in the hands of the men who have to locate the troubles, many devices have been invented, manufactured, and highly extolled in advertisements. Ever increasing experience has shown that what is uncertain and complicated must be discarded as unsuitable for the work in hand. A fault finder which shall tell where the wire is open, grounded or crossed with another wire, to be useful, must be simple, as well as accurate and reliable.

Mr. H. H. Woodworth, Advertising Manager, the Automatic Electric Co.

The Leeds & Northrup Company, 4901 Stenton avenue, Philadelphia, Pa., which has long been manufacturing accurate electrical measuring apparatus, has recently, with the advice of many wire chiefs and telephone engineers, developed a fault finder which it believes will fill the practical requirements of reliability, simplicity, speed and accuracy in a unique manner.

The appearance of the apparatus is well shown in the illustration. The size of the box complete with the contained battery is 6½" x 8" x 10", and weighs 10½ lbs. While the circular slide in the illustration might suggest a contact moving over a delicate and easily broken slide wire, this is not the construction used. A new method, on which the Leeds & Northrup Company holds U. S. patents, enables a uniform variable slide resistance to be gotten in practically infinitesimal steps, and to have a resistance of not less than 100 ohms, and to be, withal, so substantial as to last for indefinite usage, the company believes.

In the cover of the apparatus is contained in unmathematical, simply expressed language and clear diagrams, instructions for making the many kinds of tests to which this apparatus is adapted. By connecting the faulty and good wires and ground to the binding posts, and setting the three switches as directed, anyone without extensive previous experience may locate the great majority of faults and opens such as occur in telephone cables.

The directions give an arrangement by which the resistance of the conductor loop can be directly measured with accuracy. Four methods are given by which faults may be located; these faults being either grounds or crosses between the wires. Generally these methods may be used in succession for the same faults, thereby checking one another. The directions show how, by connecting to the posts a telephone and a small buzzer, the distance from the station to the point where a wire is broken may be located with simplicity and accuracy. The same apparatus can be used by a new method to measure high resistances, such as the resistance of faults. The set contains its own batteries, but can be used with outside battery not exceeding 110 volts. When such an outside battery is used, resistances of several megohms may be measured.

The simplicity of the apparatus, together with the clearness and fullness of the directions for using it, make it adaptable for the immediate use of unschooled persons who have to work on cables.

A fault finder of this make is essentially intended as a piece of apparatus to save money. The saving consists in being able to avoid unnecessary and expensive cutting of cables, and the employment of wire chiefs and highly skilled labor to discover the location of the trouble. The mechanical construction, the quality of the material used, and the finish given to this fault finder is that familiar to users of Leeds & Northrup high grade instruments, making it an instrument of pleasing appearance as well as practical value.

The New Leeds & Northrup Fault Finder.

H. H. WOODWORTH, OF AUTOMATIC ELECTRIC CO.

THE advertising department of the Automatic Electric Company, Chicago, Ill., has been for some years past under the direct charge of Mr. H. H. Woodworth. A most extensive experience in handling advertising and general publicity matters has fitted him for this work and also for his new duties in connection with pushing the sales of Automatic telephone apparatus. Going to Chicago from Moline, Ill., in 1895, shortly after graduating from the public schools at that place, he immediately went into the street car advertising business, and after learning the general principles of advertising, became the Chicago representative of a large Detroit tobacco firm. During the Spanish-American war he resigned his position and served in the Navy, on the U. S. S. Lancaster.

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THE EXCHANGE MANAGERS' AND THE SUBSCRIBERS' FLYING WEDGE

IRRESISTIBLE

IRRESISTIBLE

THE DEMAND FOR

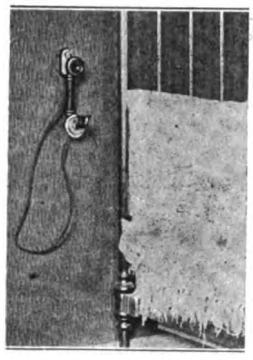
Easophones

The WIRE & TELEPHONE COMPANY of AMERICA ROME, N.Y.

See what they mean in the bed-room.

No objectionable features.

In case of fire! Illness! Burglary! Calls at night! Invaluable in case of emergency!



Bell box is out of sight.

Switch hook box and instrument are small, out of the way, attractive and practically indestructible.

The one type of phone never in trouble.

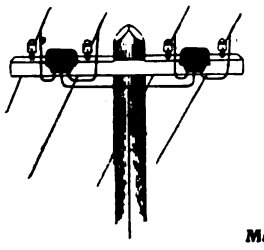
FOR COMMON BATTERY & MAGNETO SYSTEMS

Write for Bulletins No. 101 and No. 102

THE WIRE & TELEPHONE CO. OF AMERICA, Rome, N. Y.

Manufacturers of telephones, telephone supplies, bare copper, annunciator, magnet and rubber covered telephone wire.

DON'T STOP



Keep right on going and erect your

CHAPMAN LIGHTNING ARRESTERS NOW.

They will keep your lines clear of static charges this winter, and be ready for the early spring storms.

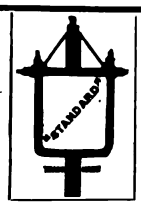
Manufactured by

MINNESOTA ELECTRIC CO.

MINNEAPOLIS, MINN.

H. E. Cobb, Selling Agent, Monadnock Block, Chicago, Ill.

Telephone Wire



and Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables

Aerial—Underground—Submarine Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company

PITTSBURGH, PA.

Boston. New York. Philadelphia. Atlanta, Ga. Chicago. St. Louis. San Francisco, Cal. Los Angeles, Cal.

Lightning Effect Number One

GRADUAL STATIC ACCUMULATIONS. While a storm is passing over a telephone line it causes a rise in static potential on the section of the line directly beneath it.

¶ This charge represents an electric displacement in the dielectric between the line and earth.

¶ This accumulation gradually builds up until a discharge takes place between the clouds and the line.

¶ If no other path to earth is provided a wet or even a dry pole will serve the purpose, generally resulting in the destruction of one or more poles.

¶ The discharge or equalization of potential results in a surge on the line which usually manifests itself at the central office and subscriber's equipment in a manner destructive.

SKY ROCKET ARRESTERS

are so constructed that they keep the line absolutely free from this accumulation, so that a charge sufficient to cause a "stroke" never occurs.

¶ It provides in its fifty inches of coiled discharge surface and grounded cylinder an easy path to earth, one the lightning always takes, and

IT ALWAYS PROTECTS

Cost Small—Savings Large

Write to-day for sample

CHANCE MFG. CO.

CENTRALIA, MO.

EFFECT No. 2 NEXT WEEK

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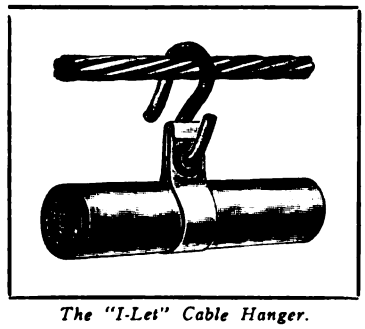
What the Manufacturers Are Doing

Upon his return at the end of the war he joined the editorial staff of the Chicago *Times-Herald,* which later became the Chicago *Record-Herald,* in July, 1900. Here he became thoroughly familiar with newspaper work, and acquired an experience in the best methods of presenting information to the public which has stood him in good stead since July, 1904, when he accepted the position of advertising manager of the Automatic Electric Company. His promotion to the additional duties of assistant sales manager on July 1st, 1907, has given him a chance to broaden his work, and at the same time continue to keep in touch with all persons interested in automatic apparatus through the medium of the advertising which he still handles.

A NEW METALLIC CABLE HANGER.

THE Yonkers Specialty Company, Yonkers, N. Y., manufacturers of the well-known Metropolitan cable clips, has placed on the market a new hanger known as the "I-Let" metallic cable hanger. This hanger has a hook quite similar to the "S" hooks commonly used with marline hangers, and is offered at marline prices.



The "I-Let" Cable Hanger.

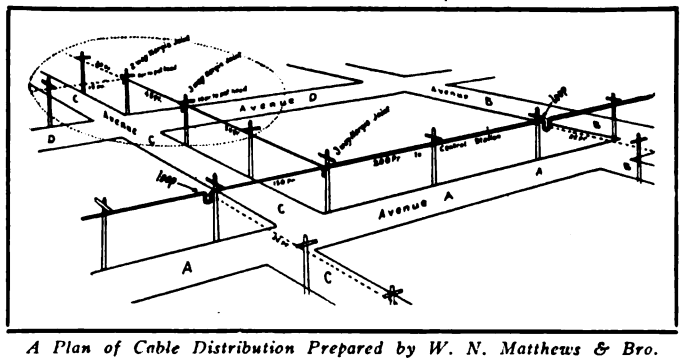
The manufacturer of this device has had a large experience in the manufacture of all kinds of metallic hangers, but has never before offered a metallic hanger to compete in price with the old-fashioned marline hanger. In the "I-Let" hanger is substituted for the marline a strap of zinc, which metal has proved to be the most durable and satisfactory for this class of work. The holes in the zinc strap for the insertion of the galvanized "S" hook, are reinforced by brass eyelets; hence the name given to this hanger.

Aside from its durability, which is of course, an important feature of any aerial cable hanger, the metallic hanger affords protection to a lead aerial cable from two important sources of danger, namely from lightning and from high tension crosses. By having an intimate metallic connection between cable and supporting wire, and by grounding the latter at frequent intervals, the damages resulting from lightning and electric light wires are localized instead of scattered throughout the cable, and therefore the maintenance expense from these causes is greatly reduced. In other words, a good metallic connection between supporting wire and cable and between both of these and the ground is necessary, and the Yonkers Specialty Company states that its hanger obviates the use of a metallic bond which good practice has shown to be otherwise essential.

To those who are willing to investigate these facts for themselves and who have heretofore hesitated to use metallic hangers on the ground of expense, the "I-Let" metallic hanger should prove interesting. The company will cheerfully send information.

FLEXIBLE CABLE DISTRIBUTION.

THE possible demand for increased telephone service for some time to come having been ascertained by the classes of business houses and residences in the various sections of a city, the laying out of the cable in the most practical and economical manner, so as to admit of a changeable distribution, is the most important work of a telephone engineer.



A Plan of Cable Distribution Prepared by W. N. Matthews & Bro.

In the section within the dotted lines on the accompanying plan of cable distribution, it has been estimated that 20 direct telephones, 24 two-party-line telephones and 72 four-party-line telephones may be in use within the next five years. In other sections similar estimates are made. The cable is then laid out from the central station to the various districts to accommodate the present and growing service.

In the illustration, a main 200-pair cable has been laid out along Avenue A to the intersection of Avenue C. A loop is left at the intersection of Avenue B. At the intersection of Avenues A and C, a 3-way "Hargis" splice is constructed with 200 pairs in, 150 and 50 pairs out. At the pole to the left of the 3-way "Hargis" splice in the 150-pair cable, a loop is also left for future use. The 50-pair cable is run along Avenue C and terminates at Avenue D in a 3-way "Hargis" splice. A 10-pair cable is run into a pot head for service in the immediate vicinity to accommodate 5 direct, 4 two-party and 12 four-party-line telephones and a 40-pair cable continuing up Avenue C to a 2-way "Hargis" joint with 40 pairs in, 5 pairs out, to a pot head for direct service and 35 pairs dead.

Later a 20 and a 15-pair cable are run into the "Hargis" joint constructed at this point. The 15-pair cable is laid out to accommodate 5 direct, 10 two-party and 20 four-party-line telephones; the 20-pair cable to accommodate 5 direct, 10 two-party and 40 four-party-line telephones. This makes 116 telephones served by a 50-pair cable.

Later it may be found that a 25-pair cable, for the four-party-line service must be spliced in the loop at the intersection of Avenues A and B. It may also be found necessary to splice a 25-pair cable for four-party-line service in the loop left in the 150-pair cable at the corner of Avenues A and C. The pairs in both 25-pair cables are spliced to the same wires or conductors in the 150 and 200-pair cable which runs to the central station and leaves a margin of 50 four-party-line telephones that may be added and use the same conductors in the 200-pair cable.

If all the pairs so far laid out up Avenue C are in use, and also the two 25-pair cables, making a total of 166 telephones, there is still sufficient capacity in both the 150 and 200-pair cables to accommodate 50 four-party-line telephones and 125 dead, in both the 150 and 200-pair cables for future use. If the section to the left of Avenue C, along the 150-pair cable, should be used up at the same ratio as the section within the dotted lines, it would be found that there still existed in the 125 dead pair a capacity for 340 telephones before it would be necessary to install more cable along Avenue A.

Should it become necessary to change the distribution in any section, the "Hargis" joint may be quickly opened, multiples changed, the sleeve replaced, and tightened with a pair of spanner wrenches without having to cut the sleeve or blow the solder, which is necessary when the same work must be done on a horizontal wiped joint.

If trouble exists in the cable near the intersection of Avenues A and C, which cannot be located from the central station, the trouble man takes his test set to the joint, unscrews the sleeve from the joint and in a few minutes he will know if the trouble is in the 200, the 150 or the 50-pair cable.

The above is taken from a vest pocket edition of a booklet full of good information containing 28 illustrations of cable splicing and construction. A free copy of this booklet may be obtained by writing to W. N. Matthews & Bro., 210 N. Second street, St. Louis.

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THE CALCULAGRAPH

STOPS USE OF TOLL LINES BY OPERATORS

for the purpose of verifying time of conversations. Often a busy toll operator neglects to make out a ticket. She calls up the operator at the other end of the line and between them they "patch up" the ticket by guess work.

The CALCULAGRAPH eliminates such conversation by rendering it unnecessary.

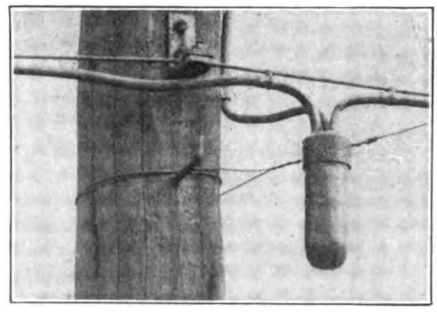
IT MAKES NO CLERICAL ERRORS

Get Our Reason Why Booklets.

CALCULAGRAPH COMPANY

1437 JEWELERS BLDG., NEW YORK CITY

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.



A COMPLETED

Hargis Cable Splicing Joint

(Moisture-Proof)

differs only in appearance, the principle remains the same as the old style wiped joint. Its position in regard to the cable and messenger wire is practical. First, because the joint is on top, and therefore easier to inspect; and second, because when the splice is opened the conductors hang downwardly and are in a more accessible position. The pouring of the solder is very simple. There is no wiping necessary. In the old style Horizontal Wiped Joint both ends must be soldered and carefully wiped. This requires a knowledge and skill which many otherwise good cable men do not possess.

The position of the conductors is more practical for boiling out (simply immerse the exposed conductors in a pot of hot paraffin); it is more practical because of the greater ease in tagging the wires for conductor assignments and also for splicing.

The splicing of the individual pairs is identical with the old method, except that the paper sleeves are put on after the wires are spliced.

You will see from the above that any cable man is very well acquainted with the principles of this device. The difficult and objectional features of the Horizontal Joint are eliminated. Everything else remains the same, except the position of the Joint.

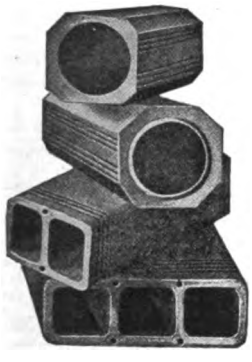
If you are considering new cable construction or changes in your cable plant, you should write us at once for information, prices, etc., on the Hargis Joint. They will save you time and money. You will improve your cable construction.

W. N. Matthews & Brother

Manufacturers of Patented Money Saving Specialties,

214 N. SECOND STREET ST. LOUIS

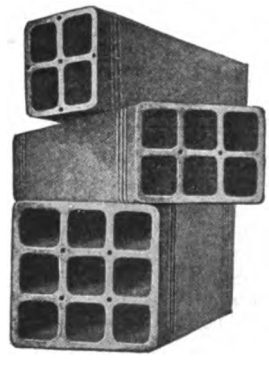
Branches: New York, San Francisco.



VITRIFIED

CLAY CONDUIT

SINGLE and MULTIPLE DUCT



IMMEDIATE DELIVERY ON ALL STANDARD SIZES

Factories: New Jersey, Pennsylvania, Ohio

Standard Vitrified Conduit Company

Main Offices: 39-41 CORTLANDT ST., NEW YORK, N. Y.

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Happenings in the Field

NEW COMPANIES.

HIGH POINT, N. C.—The Richford Telephone Company, of High Point, R. F. D. No. 4, which expects to construct, maintain and operate telephone lines through Davidson, Guilford, Randolph and Forsyth counties, has been organized with a capital stock of $2,000, of which $650 has been subscribed. Among the incorporators are D. M. Hayworth, Jacob Mock, J. B. Payne, William Hedgecock, A. Payne, Yancey F. Cecil, Herman Haynes, E. E. Criddlebaugh and Robert Johnson.

TOBACCOVILLE, N. C.—A charter has been granted to the Doesler Telephone Company, of Seward, Forsyth county (P. O. address Tobaccoville). Its purpose is to build and operate a telephone system in Forsyth county. It has an authorized capital stock of $9,000, of which $600 has been subscribed, and among the incorporators are A. E. Shore, J. A. Wall and R. M. Daub.

ALTUS, OKLA.—The Quanah & Mangum Telephone Company, which has a capital stock of $15,000, has filed articles of incorporation. The incorporators are E. B. Jeffrey and J. A. Henry, of Altus; K. L. Smith, of Oklahoma City; R. W. Smith, of Ennis, Texas, and others.

BINGER, OKLA.—Among the newly organized Independent telephone companies of Oklahoma is the Oakdale Telephone Company, of Binger. It has a capital stock of $420, and the incorporators are C. H. Otey, W. A. Thompson, Walter Cook, Charles C. Kime and M. Bramstetter.

HOBART, OKLA.—The Mission Telephone Company has been incorporated by D. C. Enochs, J. L. Burdett and S. B. Christy. Its capital is placed at $5,000, and it expects to establish a telephone system in and about Hobart.

BLACKBURN, OKLA.—Articles of incorporation have been filed by the Daisy Mutual Telephone Company, of Blackburn. The capital is placed at $5,000, and among those interested in the enterprise are George W. Kinner, J. O. Susley, Thomas Morris and Lewis Soper.

ALAMO, TENN.—The Crockett County Telephone Company, of Alamo, has been incorporated with a capital stock of $1,000. Among the incorporators are C. H. Scales, L. B. Harwell, John F. Sanders, J. L. Powell and E. E. Quessenberry.

CHILDRESS, TEXAS—A stock company is being formed at this city for the purpose of installing and maintaining an up-to-date telephone system. Considerable stock has already been subscribed for and it is quite probable that final plans will be completed at an early date.

CLARESHOLM, ALB., CAN.—The Prairie Farmers' Telephone Company, with headquarters at Claresholm, has been incorporated for the purpose of building rural lines from that city to the Star district. Construction on the system is to be commenced at once.

HUMBOLT, SASK., CAN.—Several of the ratepayers of Humbolt are organizing a company for the purpose of supplying the town with a telephone system. Address Telfer Bros., Humbolt, Sask., Can.

FRANCHISES.

PINCKNEYVILLE, ILL.—The special committee appointed to investigate the proposal of the Kinloch Telephone Company to install both a long distance toll and local telephone system in this city has reported favorably on the plan.

BROWNSTOWN, IND.—The Brownstown Telephone Company has applied for a new twenty-five year franchise in this city. The company has plans under consideration for extensive improvements in its plant, and for this reason desires the terms of its present franchise extended.

AUGUSTA, ME.—The Northeastern Telephone Company, which is to be taken over by strong financial interests in Maine in which the city of Augusta is to be largely represented, expects to apply to the city council for permission to erect lines in that city. Herbert Wilcox, of Augusta, who is active in the work of reorganization, states that a system is to be installed, if the franchise is granted, which is to be operated in connection with one extending from Lewiston through Monmouth, Hallowell and Gardiner.

COLUMBUS, MISS.—The Fayette Telephone Company, of Fayette, Ala., has applied to the city council of Columbus for right of way for its lines and poles in the streets of Columbus.

BUTLER, MO.—At a recent meeting of the city council a ten-year franchise was granted to Henry Reinheimer, who expects to install and maintain a thoroughly modern telephone plant in Butler.

CARTHAGE, MO.—A franchise to erect and operate a telephone line along the public highways has been granted to the White Oak Independent Telephone Company.

WINSTON-SALEM, N. C.—The franchise giving it the privilege of making long distance connections at this city, for which it applied some days ago, has been granted to the North State Telephone Company by the Winston-Salem board of aldermen.

BRIDGEWATER, PA.—Application for a franchise to construct and operate a telephone system at this city has been made by the Beaver County Telephone Company.

McKINNEY, TEXAS.—The Independent telephone franchise at this city, owned by Jesse Warden, has been purchased by a group of Dallas capitalists, whose object it is to install at a cost of between $1,500,000 and $2,000,000 an Independent system in Dallas, which will have connections with the surrounding country. Improvements are to be made by the new owners in the system at McKinney and franchises have also been secured at Amarillo, Granbury and a number of other places.

CHEHALIS, WASH.—The city council has granted to B. E. Clement, who represents Independent interests, a twenty-five year franchise, for which application was made some days ago. Work on the installation of an up-to-date common battery exchange is to be commenced at once.

VANCOUVER, WASH.—The Independent Telephone Company has secured the franchise for which it recently made application at this city and work on the construction of a thoroughly modern system is to be commenced at a very early date.

CARNDUFF, SASK., CAN.—The Minneapolis Street & Town Lighting Company, of Minneapolis, Minn., is seeking a franchise to light the town, and if this is granted will install a telephone system.

ELECTIONS.

ASHTON, ILL.—The following directors have been elected by the Farmers' Telephone Company: Chris. Gross, M. Berry, G. R. Charters and William Becker.

HEATH, MASS.—The Heath Telephone Company has elected the following officers and directors: President, W. E. Kinsman, Heath; treasurer, Herbert Newell, of Shelburne Falls; directors, W. E. Kinsman, F. L. Taylor, F. H. Smith, Herbert Newell, W. A. Barner, A. J. Patterson.

EVERETT, WASH.—The officers of the Independent Telephone Company at this city are C. S. Wiley, president; J. M. Winslow, secretary-treasurer.

GRAFTON, W. VA.—At a recent meeting of the Consolidated Telephone Company the following officers and directors were elected: Charles E. Manley, president; B. F. Bailey, vice-president; E. Fay Hartley, secretary and treasurer; J. Walter Barnes, general manager. Directors: C. E. Manley, E. F. Hartley, J. L. Ruhl, J. Walter Barnes and B. F. Bailey.

FINANCIAL.

SAN DIEGO, CAL.—Certificate of the creation of an original bonded indebtedness to the amount of $1,500,000 in denominations of $1,000, $500 and $100 each, has been filed by the San Diego Home Telephone Company. These bonds have been issued for the purpose of obtaining money to carry on the large extensions in its system planned by the company.

PLATTSMOUTH, NEB.—At a recent meeting of the stockholders of the Plattsmouth Telephone Company the capital stock was increased to $300,000.

COMBINATIONS.

ODON, IND.—The Odon telephone plant, formerly the property of W. L. Stoy, G. Abraham, W. W. Morrison and Harry Crooke, of Odon, and Peter M. Stone, of Bloomfield, has passed into the possession of William Adgis, of La Fayette, the consideration being $20,000. Improvements in the system are to be made under the new management.

BETHEL, ME.—The Bethel Telephone & Telegraph Company, which has recently installed a new switchboard and otherwise improved its system, has effected long distance connections which will give its subscribers the same service as is received from the regular long distance lines of the Maine Telephone & Telegraph Company.

JAMESTOWN, N. Y.—The Jamestown Home Telephone Company has been acquired by a syndicate of Jamestown capitalists, at the head of which is Hon. Arthur C. Wade, the purchase price, it is said, being $45,000.

VICTOR, N. Y.—The name of the new Independent telephone company, organized to operate in competition with the Empire State Telephone & Telegraph Company, is the Ontario Mutual Telephone Company. The company is to be incorporated with a capital stock of $20,000, all of which is to be held by the patrons of the company. The stock is to be divided into four hundred shares of a par value of $50 each. The company's service is to extend over practically the same territory as was formerly served by the People's Company, which was acquired by the Bell interests, and some

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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National Pole Company

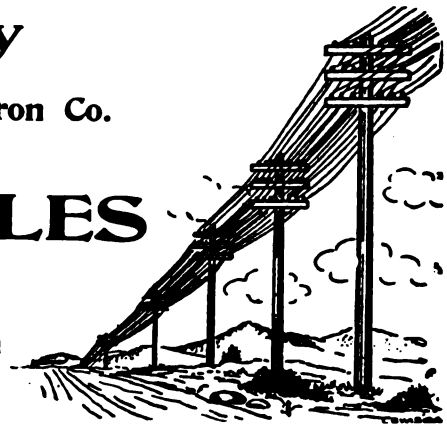
SUCCESSOR TO

Cedar Department of Pittsburg and Lake Superior Iron Co.

ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from
Maine to Washington



THE STANDARD

"HEMINGRAY"

All With The

"Patent Drip Petticoats"

THE HEMINGRAY-GLASS CO.

Office, Covington, Ky.
Factory, Muncie, Ind.

Established 1848

Thirty Years of Actual Use

Has Proven That

AVENARIUS CARBOLINEUM

(REGISTERED)

meets all requirements as a perfect wood preservative. It prevents the checking and warping of telephone poles and expels moisture from the wood, making it waterproof. It does not contain volatile or dangerous oils and ingredients; therefore it does not make wood more inflammable than it is in the natural seasoned state.

It is always in liquid form and does not evaporate. Thus it is always ready for use and may be kept for any length of time without loss.

Its application is simple and its benefits permanent.

WRITE FOR OUR BOOKLETS.

GARBOLINEUM WOOD PRESERVING CO.

MILWAUKEE, WIS.

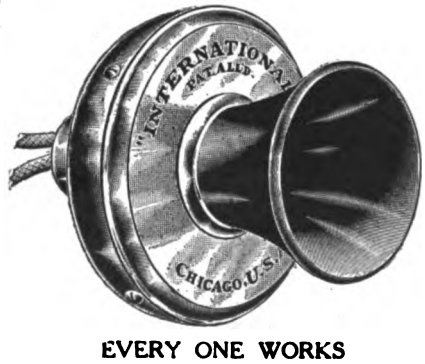
CROSS ARMS

LONG LEAF YELLOW PINE

All Heart, Special Sizes, Plain Painted or Creosoted. Large Stocks, Quick Shipments.

LEWIS LUMBER & MFG. CO.,
Hattiesburg, Miss.

INTERNATIONAL TRANSMITTERS



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Happenings in the Field

of the old lines may be taken over. Toll service is also to be established with other Independent companies whose lines pass through the various villages. The following officers have been elected: President, B. S. Partridge, East Bloomfield; vice-president, C. R. White, of East Bloomfield; secretary, Robert F. Shay, of Holcomb; treasurer, O. M. Dibble, Holcomb. The directors of the company are: B. S. Partridge, C. R. White, R. F. Shay, O. M. Dibble, E. F. Burt, W. H. Sisson, William Bowerman.

MILWAUKEE, WIS.—Plans are being formulated by the Valley Telephone Company, of Appleton, and the Milwaukee Independent Telephone Company, of Milwaukee, for the construction of an Independent toll line, to be financed and operated by the two companies, between Appleton and Milwaukee. It is the intention of the respective companies to build additional lines which will bring them into communication with Neenah, Menasha, Green Bay, Madison and intermediate points. The ultimate intention is to connect all Independent exchanges in the State of Wisconsin.

WINNIPEG, MAN., CAN.—It is understood that the trunk lines now being constructed by the telephone departments of the provincial governments of Manitoba, Alberta and Saskatchewan are to be connected and messages interchanged wherever desired.

SASKATOON, SASK., CAN.—The local telephone system formerly owned and operated by the Saskatchewan Telephone & Electric Supply Company has been taken over by Northwestern Telephone Company, and the large number of applications received by the old company will be filled as quickly as possible.

MISCELLANEOUS.

TEMPE, ARK.—The Tempe Telephone Exchange, formerly owned by C. A. Goodwin, has passed into the possession of Sanichas Bros., of Phoenix, whose purpose it is to materially improve the system.

ALEX, I. T.—The Washita Telephone Co., Alex., I. T., is capitalized for $10,000, of which $4,000 is subscribed. The company is operating a system covering six small towns, and these are connected together by about 28 miles of toll line. An additional 28 miles of party line are connected through the exchanges and switching stations, so that they can be used for sending toll messages. At the present time the town subscribers number about 75 and the company is also operating rural party lines carrying 36 subscribers. The company charges its rural subscribers at the rate of $1.50 per month, payable a year in advance, and although it finds it rather hard to get a farmer to pay the $18 all at once, on account of his money being tied up for other purposes, finds that its system is being extended at a very fair rate.

OSAGE CITY, KAS.—The Independent Telephone Exchange of this city has been sold by Mr. Schwalm to Henry Ziegenbein, of Cameron, Mo.

HOWELL, MICH.—Final arrangements for the consolidation of the Livingston Home Telephone Company and the Inter-State Long Distance Telephone Company, which is capitalized for $15,000,000, of which $10,000,000 is 6 per cent. preferred and $5,000,000 common stock, have been completed. The new company is to be known as the Inter-State Long Distance Telephone Company and the directorate is made up as follows: Hugo A. Koehler, E. A. Faust, Max Koehler, T. H. Wagner, Henry Koehler, Jr., C. Marquardt Foster and S. B. Jefferies, of St. Louis, Mo.; Wm. Woodbury, John Dwyer, Geo. Lawson, Henry Potter, Jr., Fred Moran and Wm. Barbour, of Detroit; R. B. McPherson, of Howell, and J. J. Goodyear, of Ann Arbor. There has been appropriated about $750,000 for immediate developments, and work has already been commenced.

HAMILTON, O.—The Home Telephone Company, which recently filed articles of incorporation at Columbus, is to be known as the Valley Telephone Company. It has recently increased its capital stock to $100,000 and proposes to operate lines in Warren, Butler, Montgomery and Hamilton counties.

MARION, O.—Plans are being considered for the organization of an Independent telephone company in this city, and it is said that hundreds of citizens have promised the new enterprise their support.

EVANSTON, WYO.—As a safety precaution the Oregon Short Line intends to install a telephone system in the Aspen tunnel.

PERSONAL.

C. W. REES, formerly of Omaha, Neb., has recently been appointed manager of the exchange of the Northwest Telephone Company at St. Paul, Minn.

C. H. LEIGHTON, formerly superintendent of construction of the Maine Telephone Company at Livermore Falls, has just been appointed superintendent of the Ossipee Valley Telephone Company at Bridgton, Me.

Foreward

ABBEVILLE, ALA.—A twenty mile telephone line from Abbeville into the surrounding country is to be erected by Thomas Willis.

FAIRBANKS, ALASKA.—Among the extensions under consideration by the Fairbanks Telephone Company is the construction of a trunk long distance telephone line from Fairbanks to Valdez.

FLAGSTAFF, ARIZ.—C. H. McKinney, manager of the Flagstaff Mutual Telephone Company, is constructing a line 95 miles south to Camp Verde for the U. S. Forest Service.

HOT SPRINGS, ARK.—The construction of an Independent telephone line from Hot Springs through the Black Hills to Deadwood is being planned by Chris. Jensen, of Hot Springs.

LOS ANGELES, CAL.—The new central station and executive offices of the Home Telephone Company are in a state of completion, and work on the West Adams street exchange is progressing rapidly. At the present time the company has more than twenty-nine thousand telephones in use, and the large number of new applications for service now on file will necessitate a considerable extension of its system.

TURLOCK, CAL.—The Turlock Telephone Company, which has recently come under the management of John D. Gall, is to expend about $7,000 in the improvement of its plant. New lines are to be built in Turlock and a number of rural lines are to be erected.

WENGLER, CAL.—A new telephone line, eight miles in length, extending from Wengler to Big Bend, is to be constructed under the direction of T. G. Moore. This is a local enterprise, and Mr. Moore expects to establish connections with the Redding-Wengler Telephone system.

MERIDEN, CONN.—The Meriden-Middletown Trolley Lines are to be equipped with a telephone system.

DECATUR, ILL.—A new telephone system, which it is estimated will cost in the neighborhood of $100,000, is to be installed by the Home Telephone Company in this city.

LOMAX, ILL.—The line between this city and Stronghurst is to be rebuilt by the Lomax Telephone Company.

PITTSFIELD, ILL.—Work on its system in Pittsfield is soon to be commenced by the Farmers' Telephone Company.

MARQUETTE, MICH.—The Government contemplates the installation of an improved and greatly enlarged telephone system at its maritime works on the St. Mary's river. The plan includes the connection of all the piers at the ship canal, as well as the various other federal stations. These improvements will greatly facilitate the government business at the locks.

BUTTE, MONT.—About three thousand telephones are being installed by the Independent Telephone Company in this city.

SYRACUSE, N. Y.—The Syracuse Independent Telephone Company, of this city, has under consideration plans for the improvement and extension of its system, which will represent an expenditure of about $150,000. Many new telephones are to be installed, to take care of the company's new business, and a considerable amount of new cable is to be laid.

SANFORD, N. C.—In addition to the ten miles of new line which it has recently built into the Lick Creek section, the Sanford-Jonesboro Telephone Company expects to extend its lines still further in that country. When its proposed improvements and extensions are completed it is expected that Lee County will be completely covered with an up-to-date rural system, which will give first class service to all of the farmers in that section.

ROCK LAKE, N. D.—Work on the construction of its system is being carried on by the Farmers' Telephone Company.

BERLIN, O.—The Berlin Center Telephone Company, which has established connections with Jackson and Youngstown, and through Youngstown with Canfield, is contemplating a great many other improvements and extensions in its system.

WEST MIDDLETOWN, PA.—A line from Washington to this city has been constructed by the State Mutual Telephone Company, which will give the local exchange connections with Washington subscribers.

ANAHUAC, TEXAS.—A long distance line from Stowell to Anahuac is soon to be constructed by Anson Miller.

GRAFTON, W. VA.—A considerable number of improvements and extensions in its plant are being considered by the Consolidated Telephone Company.

DODGEVILLE, WIS.—The New Union Telephone Company is making a number of improvements in its system in this city and many more are planned.

NEW LONDON, WIS.—The Farmers' Telephone Company, which has but recently been organized, expects shortly to commence the construction of its system.

CHEYENNE, WYO.—A telephone exchange is to be installed in this city by E. B. Shafer, of Casper, for the purpose of connecting a telephone line west of Cheyenne with towns in Nebraska along the line of the Northwestern Railroad.

LUMBY, B. C., CAN.—Construction work on an Independent telephone line from this city to Vernon, under the charge of C. S. Stevens, has been commenced.

BLENHEIM, ONT., CAN.—Work on the construction of its line from Blenheim to Guilds has been commenced by the Blenheim & South Kent Telephone Company.

UNDERGROUND.

CHAMPAIGN, ILL.—The city authorities are considering the advisability of compelling all wires in the city to be placed underground.

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VOLUME XVI. SATURDAY, NOVEMBER 2. NUMBER 18.

A New Co-operative Telephone Exchange in the Capital of Finland*

By Georg Bergh.

POWER and terminal apparatus is grouped on the fourth floor of the new Co-operative Telephone Exchange at Helsingfors. A feature of the system of distribution of wiring in the exchange terminal room which is not encountered in American practice is the separation of the protectors from the main distributing frame. Two hundred pair lead cables run up from the basement, and come in upon the floor in two rows. Here they are spliced to wool-insulated cables in fifty pair units, four of which are assigned to each of the cables from the basement. The wool cables are connected directly to protecting devices in a special frame provided for them. This protecting board is also arranged to facilitate the work of the troubleman. Lines from the wire chief's desk terminate near the frame in plugs attached to cords of sufficient lengths to cover assigned sections of the protective apparatus. Each protector is provided with two test springs, so that the trouble clerk located in this part of the room has only to follow instructions, and insert the test plug directly into the protector, without the removal of heat coils, to make it possible to obtain an in and out test from this point. The wool cables extend from the office side of the protective apparatus to the line side of the main distributing rack, which is in the strictest sense in this exchange used for the distribution of lines. This frame is arranged for four hundred lines in each row of terminal strips. The line terminals are mounted in hard rubber blocks. As the frame and building are laid out in such a way as to leave room for nearly one hundred rows, it appears that provision can be made, if necessary, for ample growth for years to come in the terminal room, additional operating room space being provided by the removal of other departments. On the multiple side is space for about thirty thousand lines to the switchboard. A certain amount of cable between the frames is run beneath the floors. In order to make this possible the lower floor is made of concrete, like all other floors in the building. A false floor of wood is placed above, and the frames are so designed as to be wholly above the floor, with necessary cabling beneath. The false floor in the terminal room is supported upon steel beams run between the columns, thus providing a firm structure. The distributing frames are built of iron pipes.

View of Operating Room During Progress of Installation:—Women at Work on Cables.

In the power plant provision is made against any possible interruption of current for charging the batteries by the installation of duplicate sets of motor generators. One set, having an alternating current motor, is supplied with power from the mains of the electric company supplying the city; while a direct current machine is held as a reserve, and may be driven by the company's own plant in the basement. Duplicate motors for ringing current machines are also provided, one being arranged to run off the batteries in the central office, while the other is supplied with current by the electric lighting company. The batteries are located in a separate room, which is well ventilated and placed near the power switchboard. Ample provision is made on the fourth floor of the exchange building, in a room separated from the mechanical department, for the comfort of the operators. They have a dining and retiring room, which is attractively furnished, and a kitchen connected with it permits of the preparation of such food as may be properly served during recesses. The working day for the operators is much shorter than is established in many places, five hours being the regular period, with a recess of 20 minutes in the middle of the trick.

The special arrangements for the lighting of all apparatus, and in fact every part of the building, which were so carefully planned by the architects, form a very attractive feature of this exchange. It has been found that this system has a very practical value, as it is a constant aid to the location of those slight defects which in time are likely to cause serious difficulties in a telephone exchange if not looked after promptly. The exceptionally good lighting enables those in charge of this plant to locate these trifling faults as soon as they appear, and conse-

*Continued from the issue of October 19.

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quently all apparatus and wiring is easily kept in perfect order.

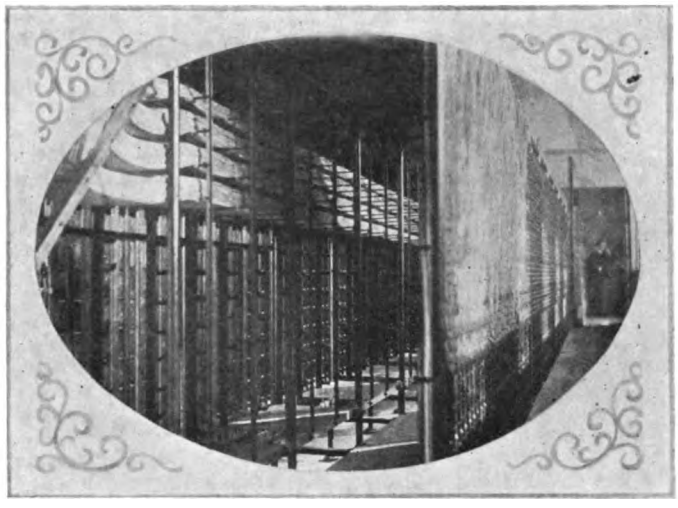
During the installation of the exchange a great deal of the work upon the wires was done by young women. In one of the accompanying photographs they are shown at work in the operating room, where they were employed to form cables, solder connections and perform other branches of installation work.

(To be Concluded.)

REASONS WHY A SUBSCRIBER SHOULD PAY THE COST OF MOVING HIS TELEPHONE.

MANY telephone men seem to be anxious to get the opinions of their associates on this important question. The Editor on October 19 published an invitation to submit reasons, and a number of interesting communications have been received. One, from a well known engineer, reads as follows:

"The obvious reason for making a charge for moving a telephone is, that when a company fixes the rates which it shall charge for service it takes into consideration the cost of furnishing such service and makes a rate which will provide a reasonable profit above the cost of operation. No extraordinary expense except possible extra maintenance charges should be taken into consideration, and no charges of any kind should be considered that will not affect each subscriber to the exchange equally.



Partial View of Distributing Frames and Cabling.

"Only a portion of the subscribers move. It is evident that if in fixing its rates the company should add the cost of a move to the annual rental rate there would be an unjust charge made upon a large proportion of the subscribers. In the old Bell days, when rates were high and were not fixed by the cost sheet, it was customary for many companies to move telephones free, but even then the permanent resident did not receive as much for the money paid to the company as the one who moved occasionally. A company has no right to charge John Smith, who lives in his own home, is a permanent resident of the city and a substantial user of telephones, for an extra which he never has occasion to demand. If it did it would be like the tailor who, when asked by the writer why he charged such high prices for his clothes, replied that it was because he had so many customers who never paid their bills. It looked to me as though I was paying his bad debts if I paid for the clothes he made for me.

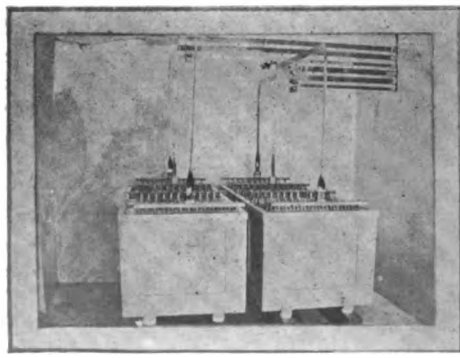
"It seems to me that this is the whole meat of the nut and it does not appear to have a very thick shell. As a matter of fact, I have moved thousands of telephones where the cost of the move has been in excess of a whole year's rental. Where would the dividends from the rent on those telephones be if the company had to stand the cost of moving? There is a nut that is worth trying to crack."

The field is not yet closed, and communications bringing up any new points of interest will be welcomed.

THE U. S. LONG DISTANCE TELEPHONE CO. AT WAR WITH NEWLY SUBLICENSED COMPANY IN MARION, O.

THE United States Long Distance Telephone Co., which has been handling the toll business of the Marion County Telephone Co. at Marion, O., recently endeavored to sever the connections of its toll lines from the Marion County Telephone Company's exchange, because the latter has consolidated with the Central Union (Bell) organization. Upon the endeavor of the U. S. Telephone Company to remove the toll wires, a hard battle between the employees of the Marion County Telephone Company and the U. S. Telephone Company was narrowly averted. The Independent Long Distance Company appealed for a temporary injunction against the Bell company restraining the latter from cutting, destroying or in any way injuring the property of the former corporation. This injunction was granted early in the evening and at midnight the Marion County Telephone Company secured an order of temporary injunction restraining the U. S. Telephone Company or its employees from cutting, injuring or destroying any of the wires into the local exchange.

The fight is the outcome of the recent merger of the Independent and Bell telephone interests in Marion County. At the present time the Bell long distance wires are operated at the Marion County Exchange and the U. S. Company claims that it is being discriminated against by the Marion County Telephone Company and that its receipts for toll business have fallen off largely in cases where the Marion County Company has been able to cause its subscribers to talk over the Bell lines where they formerly used those of the Independent company. Also, the Bell company was able to switch its subscribers in other exchanges on to the Independent lines, thus securing valuable connections through the intercession of the Marion County company. There is strong talk in Marion of organizing a new company, which shall be able to secure to them the advantages of connection with the other Independent exchanges, more highly developed than those of the Bell company. This is one of the most important situations which has yet arisen in the struggle for supremacy in the telephone business in Ohio, and will be watched with keen interest by telephone men all over the country.



Storage Batteries in the New Helsingfors Co-operative Telephone Exchange.

Power Switchboard and Charging Set; Duplicate Charging Set Not Shown in Photograph.

Interesting Arrangement of Tables About Pillar Seats in Retiring Room.

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Magneto Lamp Signal Telephone Switchboards

By G. A. Joy.

THE magneto switchboard with lamp signals is a comparatively new idea. A few years ago all toll and magneto boards were equipped with drop signals—the simplest and oldest signal used in the telephone business.

The ever-increasing size of the modern toll boards made it necessary to compress the equipment in the face of the board into a smaller space; and since the jacks were already reduced to as small a size as was advisable, the only thing left to do was to reduce the size of the signals. If the drop coils were made smaller they became less sensitive and consequently it was folly to proceed in this line. There remained only one thing to do—that was to eliminate the cumbersome drops from the face of the board and replace them by the small lamp signals. This same method of procedure was followed out in common battery boards. The first signal was the drop, the same as is now seen on the ordinary magneto boards. To reduce the work for the operator, this was replaced by the gridiron, rotary and other self restoring signals; and when the question of space became a consideration these signals were quickly discarded for the lamp signal.

In common battery exchanges the removal of the subscriber's receiver from the hook-switch closes a battery circuit through the winding of a relay at the exchange. This relay then attracts its armature, which closes a local circuit through the line lamp, causing it to be illuminated. The relay remains operated until the operator answers, or the calling party returns his receiver to the hook. In the case of the magneto telephone exchange

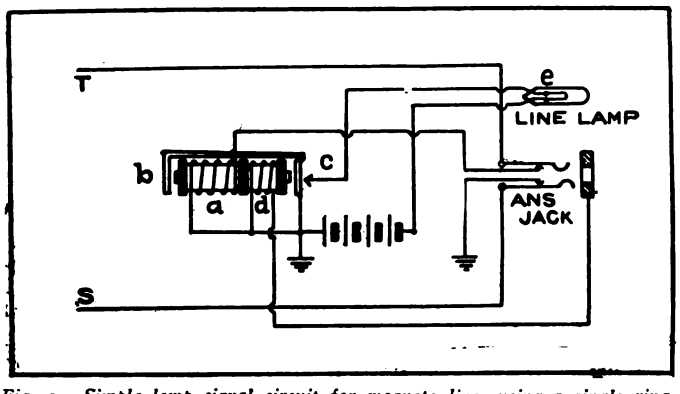

Fig. 1. Simple lamp signal circuit for magneto line, using a single ring-down relay.

the operation is more complex, since the source of signaling current is a hand generator, which gives out an alternating or a pulsating current instead of the continuous current furnished from a battery in the common battery exchange. Alternating or pulsating current will operate a relay at the exchange, but the armature of an ordinary relay will come up and fall back with each alternation or pulsation of the hand generator current; consequently the lamp will "flicker" and will even furnish this unsatisfactory signal only while the generator is being operated if some means is not provided for holding the relay in its operated condition when once energized. There are many methods by which this has been accomplished. The most simple type of circuit is the one using what is known as the "drop relay." This was probably the first method employed and is in use at the present time in a great many Bell exchanges, where alone it can be found, as it is covered by Bell patents.

Figure No. 1 shows a line circuit which will suffice to indicate the operation of the "drop relay." The hand generator current comes in over the line and passes through the winding *a* of the relay, attracting the armature *b*, which in turn releases armature *c*. When armature *c* falls back it completes the battery circuit through the lamp *e*, causing it to light and so attract the operator's attention. When she inserts a plug into the jack, she cuts the winding *a* free from the line. At the same time battery will flow from the third conductor of the plug through the third conductor of the jack and winding *d* to ground, thus causing armature *c* to pull up, and so extinguish the lamp.

While this is an easy and efficient method of accomplishing the desired results, the engineers in the Independent telephone field soon devised methods equally as good. In Fig. 2 is shown a

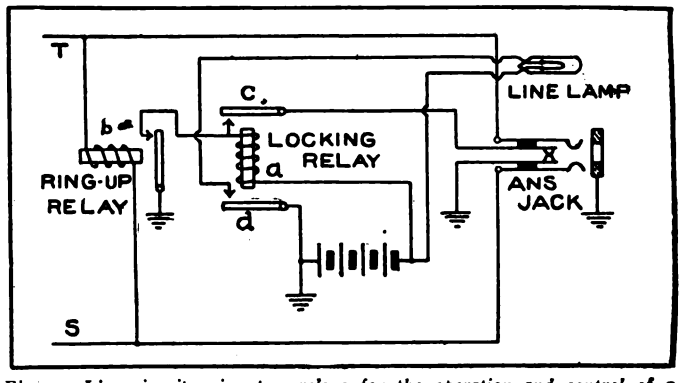

Fig. 2. Line circuit using two relays for the operation and control of a signal lamp.

method which involves the use of two relays. When a party on the line operates his hand generator an alternating current is transmitted over the line and through the windings of relay *b*, causing it to attract its armature with each current impulse. When the armature closes the contact, a circuit may be traced from ground through the armature and contact, the winding on relay *a*, to battery, and the armatures *c* and *d* are attracted. When the contact on armature *c* has once been made, it is possible to trace a circuit from the ground on the make contact in the jack, through armature *c* and the winding of relay *a* to battery. Therefore, this relay will remain operated until the operator inserts the plug into the jack, thus opening the jack contacts. As is readily seen, armature *d* closes the lamp circuit. In this system relay *b* has a single function to perform—namely, that of momentarily completing a circuit through relay *a*. This relay, when once operated, locks until released by the operator.

While the last mentioned method was found by its designers to operate in a very satisfactory way, the expense of two relays per line circuit was considered too great, so the circuit as shown in Fig. 3 was designed. This combines the two relays, and the circuit operates as follows: The alternating current coming in over the line from the hand generator passes from the tip

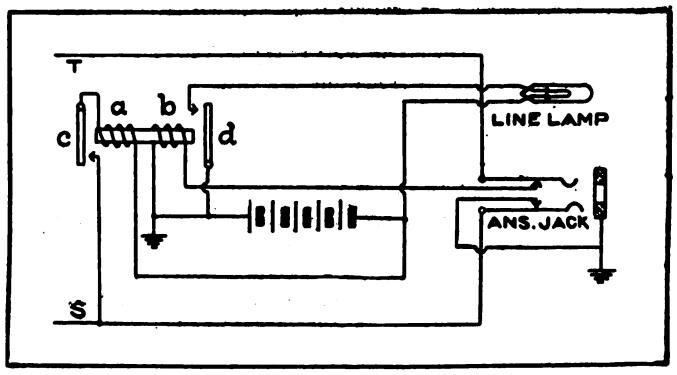

Fig. 3. A development of the circuit shown in Fig. 2 which permits the elimination of one of the relays.

side of the line through the contact in the jack, and the winding *b* of the relay to ground, and from ground through the contact on the sleeve spring of the jack to the sleeve side of the line, thus completing the circuit. This alternating current will cause armatures *c* and *d* to be attracted. Armature *c* when once drawn up will complete a battery circuit through the

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winding *a* of the relay, thus holding it in the operated position until the operator inserts her plug into the jack. This act removes the ground from the sleeve side of the line, opening the battery circuit and allowing the relay to return to its normal position. With this relay there is the practical objection that it does not always "lock up." This can be explained in this way: i. e., that the battery current through winding *a* tends to magnetize the relay core in one direction, while the alternating current of the hand generator through winding *b* tends to magnetize the core in first one direction and then the other. Now, if the hand generator is stopped so that the last impulse is in the opposite direction from, and of equal or greater magnetizing effect than the battery current, there will be an interval of time when the core will not be sufficiently magnetized to hold up the armature *c*, and so the battery circuit is broken. This condition of affairs does not often occur, and can be remedied by making the locking winding of a sufficient number of turns to increase its magnetizing power to such an extent that the alternating current through the line winding will have no effect on the operation of the relay.

(*To be concluded.*)

THE ATTITUDE OF THE DRUGGISTS TOWARD TELEPHONE PAY STATION SERVICE.

STANDARDIZATION of pay station telephone service throughout the country is one of the most important objects sought by the National Association of Retail Druggists. The association maintains a permanent telephone committee, and at the recent convention in Chicago its chairman read a report which contained, in addition to the matter quoted in a recent issue of AMERICAN TELEPHONE JOURNAL, a statement which outlines the stand the druggists will take in their future relations with telephone companies. The substance of this statement is as follows:

"Conditions surrounding the use of telephones in drug stores are chaotic to a degree that ought not to be tolerated. The percentage of compensation to druggists in whose stores slot telephones are installed runs from 10 per cent. to 50 per cent. of the receipts; flat rates range from $36 to $180. In a few cases even the latter figure is exceeded.

"The basic principle upon which slot telephones in drug stores rest was so ably presented in last year's report that we feel it should be repeated, believing as we do that this will materially increase the value of this report.

"The druggist has for nine years been accustomed to accommodate the public in many ways without direct profit to himself. When telephones came into use it was to his store the public came for free telephone service and it was by no mere chance that it did so. The drug store is the natural logical place for such service; the drug store is open more hours in the day than any other place except the saloon. Women and children can enter the drug store at any time, day or evening, seven days in the week, and be certain of courteous treatment and respectable surroundings.

"In furnishing telephone service to the public the druggist incurs an actual expense for each message sent. There is no reason why the telephone company should expect him to furnish space, attention and service for the maintenance of a public telephone station, without remuneration, nor is there any reason why the public should expect him to do so. The public as a whole is honest and is willing to pay for what it gets—is willing to pay for services rendered."

Regarding the question of slot vs. flat rate phones the report says: "Much has been said about the justice and injustice of the flat rate system. We fail to see how many men can make the claim of justice to the druggists or to anybody else, of a flat rate. If you pay $5 a week for board you get three meals a day; you can't ring in ten meals for your friends. Express, telegraph and railroad companies scorn the idea of a flat rate. Our N. A. R. D. platform has for one of its main planks, "Pay for what you get," and in this case, in rejecting the flat rate system, we are not only living up to our platform, but we, at the same time, take a stand for good service.

"Free telephoning undoubtedly leads to superfluous gossip—talk against time. In Chicago we have had statistics to prove this. Some of the Chicago druggists had under the old system from 100 to 350 daily outgoing calls, but now that we have pay telephones the number has dwindled down to ten calls and upward.

"If Bridget can use the telephone free she calls up Sam and asks him how he liked the custard pie she put in his overcoat last night and whether he got it home without smashing it all up. When Bridget has to pay for telephoning she waits until Sam reports in person, and the druggist's wire is not encumbered by nonsense, but open for business, for orders, for legitimate work.

"But this is only half the story. If the other druggists in our respective neighborhoods have flat rate telephones and allow their patrons to use these instruments free that puts us in a wrong position; all must be on the same basis. If we ourselves had a flat rate service we would probably agree with our neighbors to charge for telephoning, only to allow *preferred* customers to sneak in on the dead-beat score. Pretty soon everybody would get service free, because it is practically impossible to confine anything that is free to a few people.

"It is a sad state of affairs to contemplate, but there is no other way to enforce an agreement of this sort—it has to be done by a machine that does not permit the breaking of the agreement. If customers have to drop a nickel always before using the telephone the contract would be lived up to, otherwise not. We would therefore urge upon all druggists' associations that they resist the flat rate system in every form and under all conditions."

Determining Rates for Large Telephone Exchanges*

By W. H. CRUMB.

OBSERVATIONS made for the purpose of learning the relation between the number of times a line is used in an hour and the number of times the line is reported busy during the hour are recorded in Chart No. 9. By the phrase "number of times a line is used in an hour" is meant the exact number of outgoing and incoming messages which pass over the line in the hour.

This curve is made up from a very large number of observations and is believed to be fairly representative of conditions. It will be observed that if a line is used eleven times an hour it may be expected to be reported busy at least twice during the hour to calling subscribers who desire to communicate with that line, but if it used twenty-one times an hour it may be expected to be reported busy no less than ten times. This plainly shows that the unavailing calls increase at a tremendous rate as the load on a telephone line increases. The fact that flat rate subscribers cause an undue number of busy reports is a very substantial reason why it costs more per message to produce flat rate telephone service than measured rate.

Chart No. 10 indicates the way the total number of calls emanating from telephones in the Chicago exchange district has increased since 1893. For the purpose of these charts a call is counted each time a subscriber takes his receiver from the hook and his signal is answered by the operator. Of the total number of calls on each week day, which at present average nearly a million in the Chicago exchange district, about one-third of the

*Abstract from a paper read at a meeting of the Western Society of Engineers, Chicago, continued.

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traffic as now handled constitute unavailing calls—that is, calls made by subscribers which prove to be futile efforts and do not mature into messages because the line called for is found to be busy, or the called for subscriber fails to answer his telephone, or any of the various other fertile reasons for failure of a call to be completed into a message. Each of these calls means cost for the operations performed. To bring about good and cheap telephone service it is necessary to reduce these unavailing calls to the lowest possible number and especially to reduce the frequency called for lines are found to be busy. Such busy reports now constitute in Chicago about one-half of the total unavailing calls, the average being 16 per cent. of the total number of calls, and this is in a large degree due to the overuse of flat rate telephones; but with a measured service the telephone subscriber restricts his messages to his business or social necessities and is able to provide himself with facilities enough to handle his business without overloading his line or lines. Frivolous and useless messages are largely cut off by the introduction of measured rates, since even a small charge per message acts as a marked deterrent to the needless use of the telephone. This is illustrated by the line representing the average number of daily calls made from each telephone shown on Chart No. 10. The number of telephones has been steadily increasing, as shown on Chart No. 1, and the total number of calls per day has also been

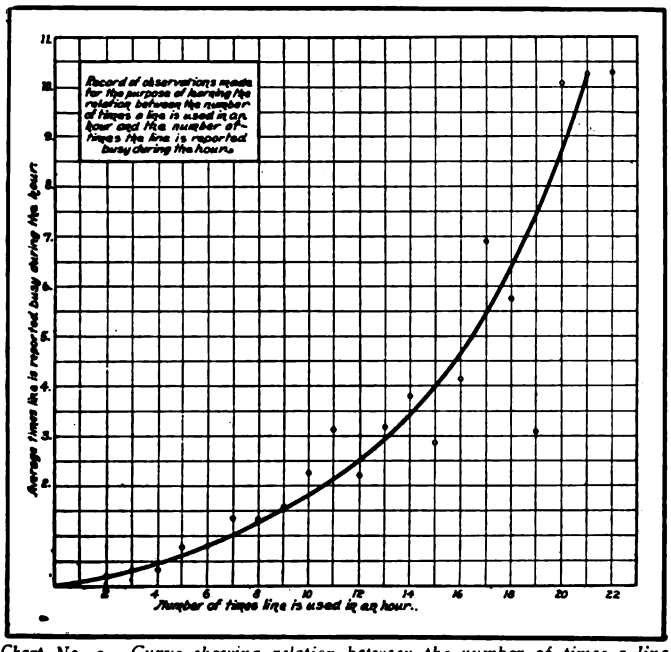
Record of observations made for the purpose of showing the relation between the number of times a line is used in an hour and the number of times the line is reported busy during the hour.
Average times line is reported busy during the hour
Number of times line is used in an hour.

Chart No. 9.—Curve showing relation between the number of times a line is used in an hour and the number of busy reports on that line during the hour.

steadily increasing, but the average number of daily calls emanating from the individual telephones began to decrease in 1899 and has decreased from an average approximating sixteen calls per telephone per day to an average approximating nine calls per telephone per day. The time that this decrease began is concurrent with the introduction of measured rates, and during the four years while measured rates were coming into vogue the average daily calls per telephone were steadily decreasing until now they have reached an apparent fixed value.

It is unfortunate that reliable data is not available whereby the exact cost per message of producing telephone service can be obtained. However, considering Chart No. 6 in conjunction with Chart No. 10 we observe that the decrease in the average price per telephone per year has been concurrent with a corresponding decrease in the average number of calls per telephone per day, and consequently the average number of calls per year. It has been this decrease in traffic per telephone that has made it possible for the telephone company to decrease its average rate per telephone. And, as has been pointed out, this decrease in traffic is due to the introduction of the measured rate basis of charging. While the average cost per telephone has decreased approximately 56 per cent. during the period shown on Chart No. 6, it would be interesting to know the decrease in the charge per message. Such data as is at hand shows clearly that the

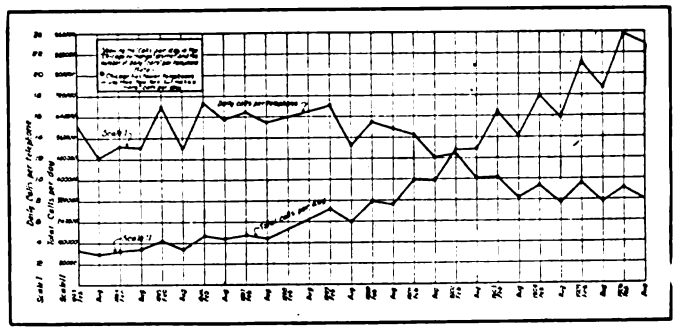

Chart No. 10.—The data points represent observations of the number of calls per day and the number of daily calls per telephone according to monthly peg counts at intervals noted.

charge per message has been decreased and it is estimated that this decrease amounts to approximately 20 per cent., which illustrates that it is cheaper per message for the telephone company to produce service in large quantities than in small quantities.

It is a tradition in telephone circles that the service per telephone costs more as the number of telephones connected with the plant increases. As the number of telephones increases each subscriber has the opportunity to call upon more people by telephone, and the law of averages would indicate that the number of calls per day from each telephone should increase, thus making the service more expensive to the operating company, provided the service is flat rate service and unnecessary use of the telephone is not deterred by a measured rate charge. This condition seems to have worked out in practice, according to the statements of telephone companies at Cleveland, Indianapolis and elsewhere, and a flat rate service seems to increase in cost per telephone as the number of telephones attached to a system increases.

On the other hand, a different condition exists in connection with measured rate service. With the measured rate service the message is the unit instead of the rental of the instrument; and it is the message that the subscriber ought to pay for, because it is for the purpose of sending his messages that he provides himself with a telephone. With measured rate service, and a reasonable use of the telephone lines, the unavailing calls are reduced to a minimum. The number of calls per telephone per day, apparently, are not inclined to increase as the system increases in extent. This is illustrated in Charts Nos. 11 and 12. But the total number of messages handled increases *approximately in proportion* to the number of telephones. Under these conditions the ordinary laws regulating the difference between the cost of producing articles in large and small quantities come into play, and the actual cost per message ought to decrease steadily. Since it is the messages that are paid for

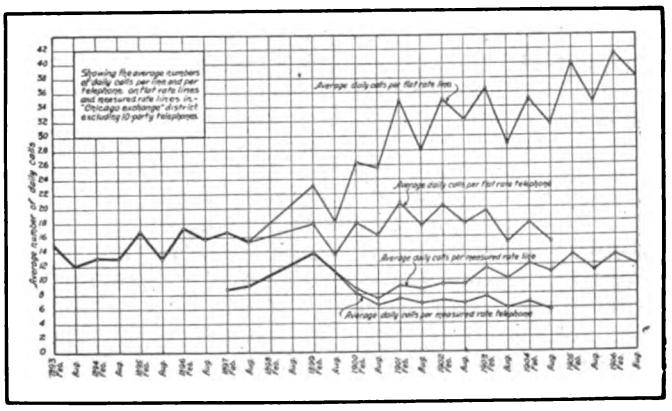

Chart No. 11.—Relation of the number of daily calls per line and per telephone under flat and measured rate methods of charging.

under the measured rate system and the actual cost per message ought to steadily decrease as the system enlarges, the average amount paid by each subscriber will decrease if the subscribers

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limit the use of their telephones to their actual needs and the telephone company is well managed.

The difference thus arising between flat rates and measured rates is very marked. The flat rate telephone user tends to increase his number of messages as the system enlarges, so that the average calls per day per telephone may be expected to increase and the proportion of unavailing calls also to increase. The consequence is that the company is forced to handle more calls per telephone as the system becomes larger, and the price per telephone has to increase under flat rate charges; while the subscribers limit the use of the telephone to their actual needs under measured rates and the number of calls per telephone does not have a tendency to increase as the system in-

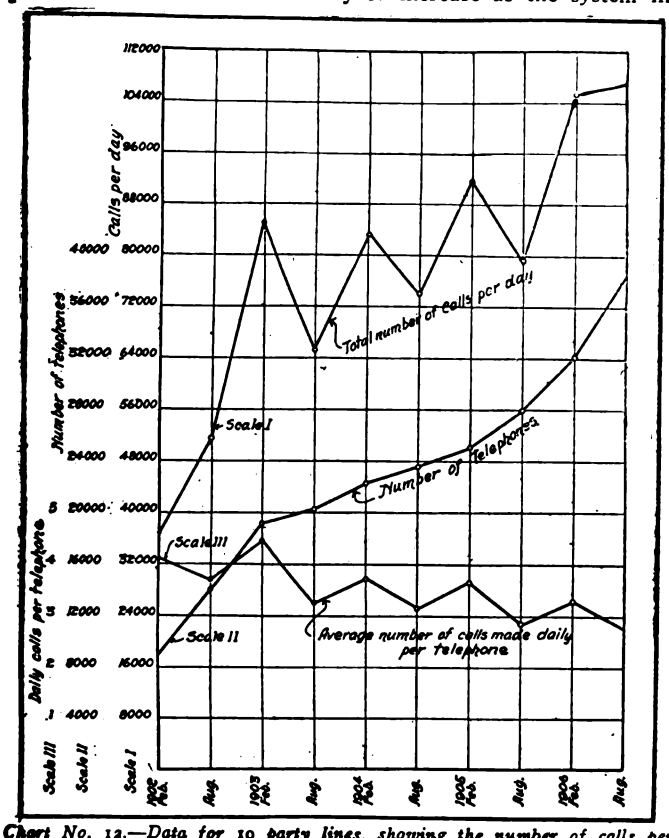

Chart No. 12.—Data for 10 party lines, showing the number of calls per day originating from these lines, and the average number of calls per day per telephone.

creases in size after it has reached a considerable development such as is now found in the city of Chicago. Under these conditions the principle of wholesale production makes it possible for the company to reduce its cost of operating per message and thereby reduce the average price charged the telephone subscribers.

The telephone hanging on the wall appeals to the average telephone subscriber as constituting the total expense to the company through the maintenance of the instrument and lines. The maintenance and the interest on the equipment does constitute a considerable expense to the company, but a great deal of the expense to the company is due to the actual cost of handling each message.

Moreover, the more calls that are made per line, the larger must be the switchboards provided by the company for making connections for communication between subscribers' lines, since each operating employee can only take care of a limited number of calls per day, and if the number of calls per telephone increases, each operating employee can take care of the requirements of fewer lines. As the operating employees are increased, the switchboards must be increased at large expense to afford additional operators' positions, and all of this increases the annual expense for telephone service. The deterrent of a small charge per message, varying from a nickel downwards depending upon the number of calls used per year, is sufficient to overcome much of this difficulty and to reduce the telephone service to a fairly uniform and business-like basis.

There is another feature which relates to the question of relative use by flat rate and measured rate users of telephones. It is impracticable to connect all telephone subscribers in a great exchange system with a single office, and it becomes necessary to arrange means for trunking the calls between the offices. This involves a double expense for operators, since one operator is required to receive the call of the subscriber at the originating office and another operator is required to complete the connection to the called subscriber's line in the second office. As the system increases in number of telephones the proportion of trunked calls is likely to increase. This is illustrated in connection with Chart No. 13 which shows the way in which the trunked calls, marked "B calls" on the chart, increase as the service extends. This chart No. 13 shows the daily number of "B calls" according to the peg counts of February and August for a number of years back, and it will be observed that the number of "B calls" consistently increased during this period. This chart also shows the number of measured rate calls originating from subscribers' lines and the number of flat rate calls originating from subscribers' lines, and it will be observed that the number of flat rate calls has increased year by year at a rate approximately equal to the increase of calls from measured rate lines, although the number of flat rate lines has not been increasing as rapidly as the measured rate lines. Chart No. 13 also shows that the rate at which "B calls" or "trunked" calls increase corresponds more nearly to the rate at which the flat rate calls increase in number than to the rate at which the measured rate calls increase in number.

The indications that are afforded by Chart No. 13 are likewise afforded by the series of load curves which we have given. A load curve is a curve showing the number of calls occurring within a telephone exchange during each hour of the day. Load curve No. 9 gives the sum of the calls obtained from the several exchange offices in the Chicago exchange district. The curves are shown as the total number of calls originating on all the subscribers' lines (marked "A" calls) on August 3, 1906, during each hour of the day, the total number of measured rate calls during each hour of the day, the total number of flat rate calls during each hour of the day, and the total number of "trunked" or "B calls" coming into all of the exchanges during each hour of the day. A point on each of these curves indicates the number of calls of the particular class during the corresponding hour of the day. The indication of "B calls" on the

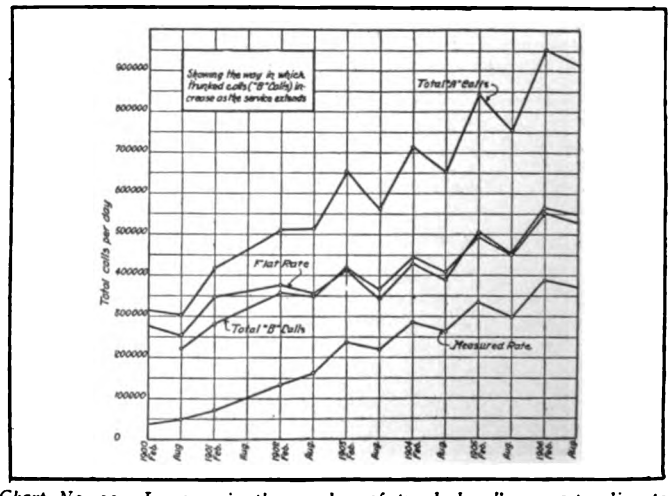
Showing the way in which trunked calls ("B" Calls) increase as the service extends
Total "A" Calls
Flat Rate
Total "B" Calls
Measured Rate
Total calls per day

Chart No. 13.—Increase in the number of trunked calls corresponding to the extension of service.

load curves for the several separate exchange offices does not afford any means of telling from what sort of a line the original calls emanated because records of the trunked calls are only made at the receiving office, while the sending office (where the "B call" is not recorded) is the only one which could determine from what sort of a line a trunked call emanates. But the total load curve makes it possible to compare the total trunked calls with the total flat rate and total message rate calls, and it will be

(*Continued on page 291.*)

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Answers to Practical Questions

CAUSE OF CROSS TALK.—(934.)

The writer has recently had an argument with a man well versed in matters telephonic on the subject of the cause of cross talk, which we would be pleased to have you settle for us by answering the following questions: Which in your opinion is the cause of cross talk, electro-static or electro-magnetic induction? Kindly give us all of the data you can on this. H. F.

AN electric current flowing through a conductor sets up a field of force about the conductor covering its entire length. This field of force consists of magnetic lines extending in closed curves about the conductor. These lines of force are going in a direction at right angles to the flow of current in the conductor. If the current flowing in the conductor remains constant in the same direction the lines of force will not change. If the direction of the current is reversed then the lines of force are reversed also. Whenever there is a movement between lines of force and a conductor that cause the conductor to cut the lines of force a current is set in motion in the conductor. This phenomenon is known as electromagnetic induction.

All conductors are capable of receiving a certain charge when connected in circuit with electromotive force. This charge, however, does not exist alone as there must be an equal and opposite charge induced in some neighboring body. In a telephone wire the induced current would naturally be in the next wire, as it would be the nearest object for a return.

From this explanation you can readily see that electromagnetic induction is a common cause of cross talk. However, the two terms are usually so confused in the vocabulary of the average telephone man that many are not aware of any difference between them.

SETTING POLES IN MARSHY GROUND.—(935.)

We are about to construct a lead of poles across a sandy marsh, in which we find it rather difficult to set poles so that they will stay. This marsh is open, and during the early Spring heavy winds blow across it, so that unless our pole lead is set very solidly we will have much trouble from this cause. Will you kindly describe in an early issue of your valuable paper an economical method of setting poles so that they will stay solid for all time? We are obliged to run our lead across this marsh, as it will save us about 25 miles of pole line. In fact, it is the only place upon which we could get a right of way for this lead. A. M. C., New York.

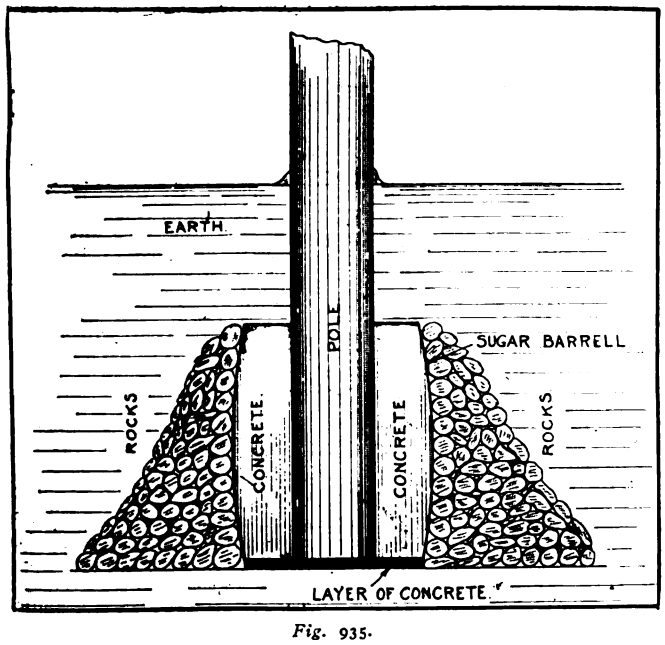

Fig. 935.

ONE way in which your poles can be set so as to secure the greatest degree of solidity at a small cost would be as illustrated in Fig. 935, which shows a cross section view of a pole set in the following manner: As your ground is sandy and soft you will not have much trouble in digging a hole of good size. In the bottom of this hole set a layer of rocks, then on top of the rocks set an ordinary sugar barrel. Pour a layer of concrete of about two or three inches in the bottom of the barrel, and surround the barrel with loose rocks, as shown. Then fill in the dirt around the barrel, leaving the top open. When the concrete in the bottom of the barrel has hardened, set your pole upright in the barrel, noting that it is properly centered, then fill the remaining space in the barrel with concrete, after which close up the entire hole in the customary manner by filling in with dirt and thoroughly tamping.

The writer has in mind a case quite similar to yours in which poles were set in this manner that afterward carried a ten-arm lead of No. 10 copper, and have successfully weathered wind and sleet storms for nine years. In the instance cited no other support or guys for the lead were used, reliance being placed entirely on the concrete ballast.

LACING SWITCHBOARD CABLES.—(936.)

Please inform me through your valuable paper how to properly lace up switchboard cable; also what kind of cord to use for this. Thanking you in advance for this information, I am, very truly yours, A. K., Iowa.

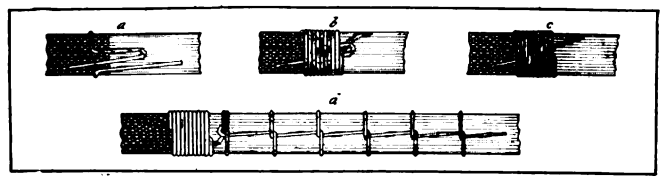

Fig. 936.

SWITCHBOARD cable is usually laced with linen machine cord, which has been boiled in beeswax, the size depending upon the cable to be laced. No. 4, 6 and 8 cords are the sizes in common use; the No. 4 cord being used for very small forms, such as jack legs. The No. 6 cord is used for the majority of forms, as it is the most convenient size. It is usually sufficiently large so as not to break easily, and still is small enough to present a neat appearance. The No. 8 cord is used to lace bunches of machine-made cable in ducts, etc. It is usually necessary to saturate the cord with beeswax after purchasing, as it is not generally carried by others than dealers in electrical supplies in the prepared form.

Before the cable is laced the end of the insulation is usually prepared for the lacing process, the preparation being termed butting. There are several methods of butting cable, but the one in most common use is to wrap the cable with several turns of linen tape one quarter inch wide, and fasten the same as a cord butt. A cord butt is an easy one to make, and as lacing twine is always at hand, is quite popular. This cord butt is shown in diagrams *a*, *b*, and *c* of Fig. 936. The other end of the twine is folded back on itself about three or four inches, leaving the loop thus formed toward the cable form. It is then wrapped around and around the cable, covering the loop for a length equal to the diameter of the cable. The loose end is then passed through the loop previously left, and both ends of the cord are pulled up tight until the knot is under the center of the wraps, at which time the ends of the cord are trimmed neatly. In some instances the end of the cord is left long and used for lacing the form. If this is not done a starting stitch should be made, as shown in diagram *d* of Fig. 936. This is practically the same thing as a cord butt, and is made in the same way, excepting that in pulling the knot in place it is pulled entirely under the completed loop, and allowed to remain on the side opposite the form. The stitching is then made at the proper distances apart, as shown in the diagram *d*. The cord is passed around the cable, then over and under itself, so that the knot will always be self-sustaining, owing to the loop holding the loose end in place. In lacing cable one must be careful to tie the stitch in this manner, for if it is simply passed over the cable and then under and over itself, it will form a stitch that will slip and will require constant tightening as the work progresses.

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As Things Look to the Editor

WHERE THE NEW YORK INDEPENDENTS STAND.

IN many parts of New York State the Independent companies have been making rapid strides in the past few years. Local business has been built up in dozens of exchanges to a point where the number of subscribers makes a most favorable showing in proportion to the entire population. Service offered in nearly all the exchanges is excellent, and toll connections over a constantly extending system of well built long distance lines are so satisfactory that leading business men in a very large section of the State use the Independent lines almost exclusively. Local ownership of securities is the means of giving the companies a strength which assures the continued ability to make extensions as the growth of the business, under the vigorous efforts to increase it along sound lines, warrants new building. Under these conditions the Independent telephone business in New York has reached a stage where united action on the part of those who conduct it is of constantly increasing importance.

New York Independent telephone men must be in a position to show the public where they stand. The need of this kind of education was strikingly exemplified some time ago when the people and officials of New York City were anxious to obtain information as to the extent of the facilities offered by Independents in other parts of the State. It is an undeniable fact that there are even now hundreds of thousands of telephone users, and thousands of men who are potential investors, in sections of New York State as yet undeveloped by the Independents, who are not at all aware of the present strength of this great industry in far the larger portion of the State.

The facts these people need to convince them of the things which it is to the interest of Independent companies to have known can only be obtained by the collection of figures showing accurately the present development, and relative importance beside their competitors, of the Independent companies in every town and city where they operate. These facts can be used in numerous ways to strengthen the position of the Independent companies before the public, to insure a strong presentation of their needs in cases of proposed legislative action, and to furnish advantageous arguments to every manager when he attempts to extend his service among the most profitable classes of customers.

For these reasons the work of preparing statistical reports, data for which are now being collected, deserves the most hearty and energetic support of every Independent telephone officer and employee who has an opportunity to lend his aid. To be valuable, of course, the reports must be at once complete and accurate. The time set for the collection of figures is short, but not too brief for securing results. The New York State men should be prepared within a few days to send to the representatives of the association in their respective counties all figures called for under the headings of the data sheet which is published on page 290 of this issue. Delay on the part of a single manager will handicap the whole organization. On the other hand, prompt and reliable co-operation will be the means of hastening the results which will be appreciated by every individual. New York men, *Get Busy!*

DEVELOPING THE OPERATORS' VOICES.

POLITENESS is a subject upon the value of which telephone exchange managers like to dwell. At the same time, in all operating rooms where there are more than four or five positions at the switchboard, reasons making for economy and efficiency in operating have made it necessary to so standardize responses, challenges, and all phrases used in communicating with subscribers, that the function of the operator has become closely identified with her more mechanical duties. She appears to the subscriber more frequently as a part of the switching mechanism—a portion of the machine which makes the service he buys—than as a saleswoman, who causes him to appreciate the value of his purchase. If she could be so trained that her work would possess more of the last mentioned quality than it usually does without interfering with her efficiency as a producer, there would be a material advantage gained.

Under existing conditions, which may be expected to continue for a considerable time to come, the only way in which the influence of personality can be developed is by vocal training. Whatever impression of courtesy and interest the operator makes upon the subscriber is primarily due to the intonation of her phrases, rather than to their wording. Probably every one who has spent much time in an operating room has noticed how materially an operator is aided in handling her position if she happens to be so fortunate as to possess an exceptionally attractive voice. Her cheerful, clearly spoken words are a stimulus to the subscriber to speak pleasantly and distinctly himself. He is even likely to be, for a moment, switched off the track of his desire to get in connection with the person called, and is not so keen about obtaining an immediate response as he is with a less fortunate reception of his call for a number. Instinctively he feels that he is being well treated, and if he receives no answer in twelve seconds will cheerfully wait twelve or fifteen more, instead of shaking the hook and demanding "Why don't you ring my party?" All this helps the operator by securing to her a freedom from unnecessary interruptions which tax not only her time, but her nerves as well. The result is always evident in the smooth and rapid handling of cords at such a position. The value of such an operator to a telephone company is made even more plain by listening observations conducted with this point in mind.

In department stores the people who come in contact with purchasers are the saleswomen. Their personality helps dispose of the goods; and if two stores are selling the same kind of material at the same price, the steady customer's trade is swung to the store which has at its counters the most courteous and attentive representatives.

Competing telephone companies especially must realize the effectiveness of this element in pushing sales of their only product, telephone service. Chief operators, monitors and supervisors may be selected, not merely for their theoretical and practical knowledge of traffic problems and operating, but for their own personal qualities, which they may to a considerable degree impress upon their subordinates. Constant emphasis of the right kind laid upon this point by the leaders in an operating room cannot fail to produce a beneficial effect upon all members of the force. Other matters, in addition to directly exerted efforts to improve vocal skill by the stimulation of the interest of the individual, will be within the province of the operating chiefs. This point may very properly influence questions of the amount and distribution of load, arrangement of reliefs, and other similar questions of operating routine and economy. In exchanges deriving their support from the users of their service it is poor business policy to make a saving of a few cents per thousand calls in the cost of switching at the expense of keeping operators during busy hours under such a nervous tension as to cause them to fail to produce a pleasant impression on every reasonable subscriber who puts in a call.

THE DRUGGISTS AND THE PAY STATION.

APPARENTLY the telephone companies which are attempting to push the installation of public pay stations have to deal with a rather well-informed body of men when they talk to members of the Retail Druggists' Association. The report of the telephone committee of that organization shows that the question of the proper kind of service has been carefully considered. It is fortunate that the attitude recommended coincides so closely with that recognized as sound business policy by most well-managed telephone companies. The drug-store pay station has always been the early forerunner of the residence station, proving itself a valuable silent aid to the contract man.

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Legal Items of Interest

CONDUCTED BY A. H. McMILLAN.

OVERBUILDING AT CROSSING.

We are building a first class exchange at this place. We have just succeeded in getting an injunction dissolved which prevented us from any work whatsoever in the place.

This injunction was brought against us by the T——— Telephone Company (Bell). We think that this was done for the sole purpose of holding us up and annoying us, as we were putting up construction work far superior to theirs.

The circumstances are these: We set a 40 ft. pole on a corner which went through a 10 wire lead of their poles, which are 25 ft. high; this lead of ours crossing over and not paralleling them. Their allegations are that it would interfere with their wires and messages, and their wire coming in contact with our pole would ground their wire, thus cutting them off from communication, etc., etc. This case will come up in District Court here. We are going to sue the company for damages, as we were held up about 60 days.

We wish your opinion on this case. Can you cite us to any cases that would be a help to us in this case? M. C.

UNDER the facts, as you state them, we cannot see how the complainant in the case has any right of action against you. You have overbuilt his line at a crossing in a way that is sufficient and would be considered good telephone construction. The following cases bear upon the circumstances of your case: Chicago Tel. Co. vs. Northwestern Tel. Co., 65 N. E. 339, in which overbuilding is held to be a proper method of construction. N. W. Tel. Exchange Company vs. Twin City Tel. Co., 95 N. W. 460; Northern Tel. Co. vs. Iowa Tel. Co., 98 N. W. 113; Nebraska Tel. Co. vs. York Lighting Co., 43 N. W. 126; Louisville Home Tel. Co. vs. Cumberland Tel. and Tel. Co., 111 F. 663; Western Union Tel. Co. vs. Guernsey Elec. Light Co., 46 Mo. A. P. 120; 3 Am. Elec. Cas. 425.

ERECTION OF MUNICIPAL LIGHT WIRES ENJOINED.

CLAIMING that the town of Edgewood is preparing to erect electric light wires under its telephone line, and that if this is done it will greatly injure the service which it will be able to render its patrons, the Atlantic Telephone Company, at Decatur, Ga., has secured a temporary injunction against the town.

The town of Edgewood is installing a municipal electric light plant, and was preparing to run the wires under the line of the Atlanta Telephone Company on the right of way to the Seaboard Air Line. The telephone company claimed that this would greatly injure its service, that it had a franchise from the town of Edgewood and permission to use the right of way of the Seaboard, and at once sought an injunction.

The town of Edgewood alleges that it has a perfect right to erect its light wires across the right of way, and is contesting the injunction and seeking to have it dismissed.

THE BUSH ACT OF KANSAS.

THE Supreme Court of Kansas has sustained the constitutionality of an act of the Legislature of 1898, commonly known as the "Bush Act." (Laws 1898, P. 27, C. 10.)

This act requires foreign corporations to comply with certain conditions, including the payment of charter fees computed upon the amount of their stock for the privilege of exercising their franchises within the state.

The Western Union Telegraph Company, in Kansas, is a foreign corporation, but was doing business within the state boundaries while it was yet a territory. It having refused to pay the charter fee prescribed by Sec. 6 of the Bush Act, the state, on the relation of the attorney general, brought action of quo warranto to oust the company from exercising its corporate franchise. The defense was that the law was not intended to apply to the company or a portion of its business affected by the suit, but, if such were the intention of the Legislature, the statute invades rights secured to the company by the constitution of the United States. The court upheld the law, deciding that the defendant company must pay the license fee or leave.

One of the contentions of the company was that this legislation operates perspectively, and was not intended to apply to foreign corporations which were doing business in the state at the time the law became operative. Answering this contention, the court decided that the law was a police regulation, pure and simple, designed to protect the people from imposition, deception and fraud; and operates upon every foreign corporation doing business in the state at the time of its enactment.

Another contention of the company was that the statute made no discrimination between corporations, which, like the defendant, were engaged in interstate commerce, and those which were not so engaged; and that there was no segregation of the intrastate from the interstate business of corporations. On this point the court held that nothing contained in the act could be viewed as having any relation whatever to the right of the company freely to enter the state, and there transact all business of an intrastate character which it might desire to undertake. So it was held that for failure to comply with the law a foreign corporation engaged in intrastate commerce and transacting business for the Federal Government might be ousted from the privilege of engaging in non-governmental intrastate business. State vs. W. U. Tel. Co., 90, P. 299.

COMPLIANCE WITH LICENSE TO ERECT POLES.

A PERMIT by the owner of a farm to a telephone company to erect its poles along a highway in front of the farm "to be set on line of fence" is substantially complied with by setting them in the road in a straight course from five to seven feet from the fence. This was the decision of the Supreme Court of New York in a case where there were large trees which, if the poles were erected in strict compliance with the agreement, would have had to be trimmed, and as little injury to the farm would be caused by the poles being so placed as if erected anywhere else along the road. Bowerman vs. Inter Ocean Tel. & Tel. Co., 105 N. Y. S. 565.

RAILROAD COMMISSION ENJOINED FROM RAISING TOLL RATES.

JUDGE E. D. SAUNDERS, of the United States District Court, at New Orleans, La., enjoined the Louisiana Railroad Commission from interfering with the toll rates of the Cumberland Telephone Company.

The court granted a restraining order on the ground that the telephone company had shown that the rates demanded by the commission would not result in the profitable operation of telephone lines in the State.

DANGER FROM NEARBY ELECTRIC WIRES NOT ASSUMED BY TELEPHONE LINEMEN.

BECAUSE the wires of an electric lighting company were only about 27 inches from the top of a telephone pole standing at the junction of two highways, a lineman, who was injured in consequence, brought suit against both the electric light company and the telephone company.

The court held that both companies were properly found jointly liable, and that it was not necessary for the injured man to allege the fact of imperfect installation and the escape of electricity by reason thereof, the injury being *prima facie* evidence that the company was to blame for it. It was further held that the danger to the lineman was an extraordinary risk and not assumed by him, unless he knew and comprehended it, or unless it was so plainly observable that he should have known and comprehended.

The court held that it was as much the duty of the telephone company to remedy the dangerous conditions of its lines caused by the proximity of electric wires belonging to another company as if it had brought it about in the first place. Drown vs. New England Tel. and Tel. Co., 66 A, 801.

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In the Operating Field

NEW YORK INDEPENDENT TELEPHONE MANAGERS CALLED UPON FOR STATISTICS.

MANAGERS of Independent telephone exchanges in New York State have just been given an opportunity to assist in compiling information which will be of the utmost benefit to them later on as individuals and as an association. Last week Secretary R. M. Eaton, of Niagara Falls, mailed to the manager of one of the Independent telephone exchanges in each county a blank form for the district report, arranged with spaces for the filling in of information under each of the follow- headings: Name of village, town or city; name of operating company; exchange, toll station, or no connection; number of subscribers; name of company controlling operating company; president's name and address; manager's name and address; Bell—exchange, toll station or no connection; estimated number of subscribers.

These facts, if furnished in a complete and reliable form, will give extremely valuable information about the telephone situation in every part of the state. Although the responsibility for getting this report to the association is placed upon the manager chosen on account of the secretary's belief in his ability to make good, and his willingness to do so on account of his loyalty to the association, it is up to every single manager in the State to assist in this work. Reports should all be in by the end of the third week in November, and this means that somebody will have to do some lively work to get everything together. Each manager in the State should lose no time in getting information about the towns reached by lines under his direct control, and forwarding it to the man in his county who makes up the report. Co-operation in getting out at this time statistics which are not only complete, but thoroughly reliable, will be tremendously effective in strengthening the New York organization, which is already established on such a firm basis. Everyone who contributes to this result will benefit by it, so that it is a matter of the utmost importance to each individual from every point of view.

San Rafael, Valencia Co.,
New Mexico.

American Telephone Journal,
100 *William Street, New York.*

Gentlemen:—

Replying to your communications of recent date, will say that while I don't happen to have a dollar bill to fold in the receptacle you so kindly provide, I do hereby enclose a post office money order for $1, *for which I would be glad to have you send me the* American Telephone Journal *for a period of one year commencing with the current issue when this order is received.*

I have looked over several copies of your Journal *and have been very much pleased with them. I don't see how a person interested in telephone matters can do without your publication.*

Very respectfully,

Yours in a terrible hurry to get the first number,
CHAS. M. GROVER, M.D.

Even in New Mexico, where affairs are usually considered leisurely, the American Telephone Journal causes a desire to hurry.

INDEPENDENTS BUY OUT BELL SUB-LICENSEE COMPANY AT NEW HAVEN, IND.

THE Bell sub-licensee company operating at New Haven, Ind., has recently been purchased by the Home Telephone & Telegraph Company, of Fort Wayne, Ind. The system thus purchased has been converted into a part of the Independent system and leaves the city of New Haven with only one toll station telephone of the Bell company in operation.

Newspaper reports first indicated that a consolidation between the Independent and the Bell companies had been effected, but such has been proven an error.

TELEPHONE SERVICE INSTALLED IN APIA, SAMOA.

IT is reported by U. S. Consul George Heimrod that Apia and adjacent plantations in Samoa are now provided with telephone service by the postal authorities. Within a radius of 3.2 miles the fixed rate for this service is $47.60 per year, and for every 328 feet beyond this radius an extra rental of $0.95 is charged.

DIRECTORY ADVERTISING.

THE Todd County Home Telephone Company, of Elkton, Ky., has devoted considerable attention to the matter of directory advertising. Mr. Frank G. Hoge, secretary of the company, states that in each of the exchanges the company endeavors to secure enough advertising matter to pay for printing and distributing the local directory. The price charged depends upon the size of the town. For example, the rate is 25 cents per inch in one place and 50 cents per inch in a larger town. In soliciting advertising, the company's principal argument is that it gets the names of business men, together with their business and telephone numbers, before the public. When the business men's numbers are printed in large type they make an impression upon the minds of subscribers sufficient to cause them to remember the number, and they will not look in the directory each time. In this way the business men who advertise get an advantage in all orders sent by telephone. For the Independent companies this also works out advantageously, as the Bell company has been so long established that its telephone numbers are thoroughly impressed upon the public mind. The impression made by the Independent numbers printed in large type in the directories causes people to remember them and use the Independent service in talking. In this way the business man becomes familiar with and favorably impressed with the Independent service.

AUSTRALIAN TELEPHONE ADMINISTRATION REDUCES RATES FOR TOLL MESSAGES.

RATES for toll line messages on the telephone system in Australia, owned by the government, have been materially reduced for all distances up to 400 miles, which apparently is the limiting distance in that country. The new schedule involves a charge of 2d. for the first three minutes and 2d. for every additional three minutes on all messages up to 15 miles; the old rates being 4d. for the first three minutes and 3d. for every additional three minutes. The complete schedule is worked out as follows:

Over 15 and up to 20 miles, new rates 3d. and 3d., old rates 6d. and 4d.; 20 to 25 miles, new rates 4d. and 3d., old rates 6d and 4d.; 25 to 50 miles, new rates 8d. and 6d., old rates 10d. and 6d.; 50 to 75 miles, new rates 1s. and 9d., old rates 1s. 2d. and 9d.; 75 to 100 miles, new rates 1s. 4d. and 1s., old rates 1s. 6d. and 1s.; 100 to 150 miles, new rates 1s. 10d. and 1s. 4d., old rates 2s. 2d. and 1s. 5d.; 150 to 200 miles, new rates 2s. 4d. and 1s. 9d., old rates 2s. 10d. and 1s. 10d.; 200 to 250 miles, new rates 2s. 10d. and 2s. 1d., old rates 3s. 6d. and 2s. 4d.; 250 to 300 miles, new rates 3s. 4d. and 2s. 6d., old rates 4s. 2d. and 2s. 9d.; 300 to 350 miles, new rates 3s. 10d. and 2s. 10d., old rates 4s. 10d. and 3s. 2d.; 350 to 400 miles, new rates 4s. 4d. and 3s. 3d.

It is also reported that the Postmaster General, Mr. Mauger, has reduced rates on the trunk line from Melbourne to Sydney to 5s. for day conversations and to 2s. 6d. after 8 P. M.

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DETERMINING RATES FOR LARGE TELEPHONE EXCHANGES.

(*Continued from page 286.*)

observed that the number of trunked calls corresponds closely to the number of flat rate calls. This is probably an indication that the greater proportion of the trunked calls come from flat rate lines, and that these lines are consequently causing more than a proportional share of the double expense of the trunked calls. A study of this question from the records of the Chicago Telephone company extending back over the period since the introduction of message rates in Chicago shows a similar indication in each year, namely, that the trunked calls correspond more closely to the flat rate calls, and that the flat rate lines apparently therefore should be properly charged with the larger proportion of the expense of the trunking service and maintaining the trunking plant.

(*To be continued.*)

PEOPLE IN DALLAS SEEK DETAILED INFORMATION ABOUT BELL COMPANY.

CITIZENS of Dallas, Tex., who are seeking to cancel the franchise of the Southwestern Telegraph and Telephone Company because of its inefficient service have prepared a number of pertinent questions which they desire the municipal commission to put to the officials of the company. C. I. Evans, the attorney representing the citizens, has submitted the following communication to the commission:

Gentlemen—I respectfully request that the following questions be propounded to the Southwestern Telegraph and Telephone Company:

"1. When and under what authority was the Southwestern Telegraph and Telephone Company chartered and for what length of time?

"2. Where is the principal office located and what business does it transact at such office and what officers and employes are engaged at that office?

"3. Has the company an office or place of business in the State of New York? If so, what is the character of the business transacted at such office, the number of its officers and employes employed at such office and the salaries or wages paid them, and the total expenses of maintaining and operating such office?

"4. What is the capital stock of said corporation, and into how many shares is said stock divided?

"5. Give the names and residences of the shareholders of all the stock and how many shares are held by each stockholder.

"6. Give the amount of payments made on such shares of stock and if made in anything else than money, state in what such payments were made and how.

"7. If any of such stock is preferred stock, state who owns it and what amount is so preferred and upon what guaranties is such stock based.

"8. Give an itemized statement of the bonded indebtedness of said corporation, the interest such bonds bear, for what purpose issued, when issued, who owns the bonds and what money was paid to the corporation for them.

"9. Give an itemized statement of the indebtedness of such corporation other than its bonded indebtedness, for what purpose contracted, to whom due and the rate of interest it bears?

"10. An itemized statement of the income of said corporation and the amounts derived from such source of income for the last year.

"11. An itemized and detailed statement of all the expenditures of such corporation for the year last past.

"12. An itemized statement of all the property of every kind owned by said corporation, where situated and the fair market value thereof.

"13. An itemized statement of all the property of said corporation situated in the city of Dallas, and the fair market value thereof.

"14. An itemized and detailed statement of the income of said corporation from its business and operations in the city of Dallas for the five years last past, year by year, and the amounts derived from each source of income.

"15. An itemized and detailed statement of all the expenditures of said corporation in the city of Dallas for the five years last past, year by year.

"16. What other towns and cities in the State of Texas does said corporation own and operate telephone systems and what prices does it charge and receive for rentals of telephones in such other towns and cities, giving the prices so charged in each other town and city separately?

"17. Attach to such statement a true copy of the contract said corporation requires its subscribers to enter into when installing a telephone."

The commission has agreed to ask what questions in the list are considered relevant.

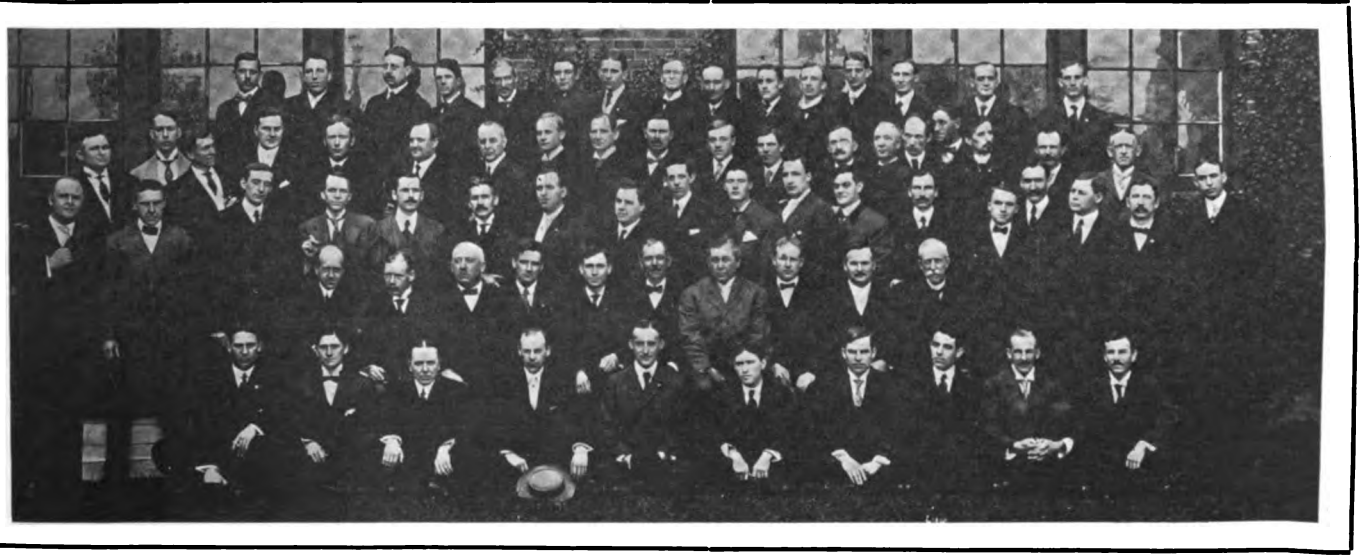
TOLL CONNECTIONS BEING HANDLED WITHOUT OPERATORS BETWEEN DAYTON AND COLUMBUS, OHIO.

EXPERIMENTS have been conducted for a week or more under the joint direction of General Managers Johnston and Ainsworth, of the Independent companies of Columbus and Dayton, O., respectively, with the object of working out a plan for the automatic handling of toll business. It is reported that the plan is already giving very many indications of being a permanent success, and if this result is achieved the subscribers in Dayton and Columbus will be able to call persons in either city without the intervention of an operator. At the present time experimental calls have been put through by holding a trunk line clear for this class of calls. If a Dayton subscriber wishes a number in Columbus he now asks the Dayton long distance operator for the trunk line, and when he is connected to it has but to operate his disc to secure connection with the desired telephone in the other city.

BELL COMPANY AT FORT SMITH, ARK., SAID TO HAVE NO FRANCHISE.

AT Fort Smith, Ark., a petition is in the Chancery Court asking that the Southwestern Telephone Company be enjoined from charging more than $1 per month for telephone service for residence, and $2 a month for business houses. The present rates are $2 for residence and $3 for business houses. A city ordinance limiting the charge to $1 and $2 respectively was passed several years ago, but has never been obeyed by the company, nor has any attempt been made to enforce it.

The petition alleges that the Bell company has in fact no franchise, and has had none since February, 1895; that the service



Enthusiastic Group of Managers of Consolidated Telephone Company's Exchanges at Annual Meeting Held in Buffalo, New York, October 19, 1907.

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is very poor and unsatisfactory, and grows worse every day, and that one cause of the inadequate service is due to the small wages paid to girls at the central station, some of them receiving only about $15 a month. Further the petition asks that the company be no longer permitted to use the streets and alleys of Fort Smith for its poles and wires. A subscription list is being circulated which already is said to have 260 subscribers to raise a fund to fight the company in the courts.

Getting Advertising for the Columbus Telephone Directory

THE Columbus Citizens' Telephone Company, of Columbus, O., publishes two directories, one for Columbus, and another for Franklin County, which contains the names of subscribers outside of the city. In connection with the advertising feature of the directory, General Manager Gansey R. Johnston is sending out a very neat circular, in which are cited the advantages to be gained by placing a card in telephone directories. The points suggested in this circular to interest the persons to whom directory advertising will appeal the most, show so thoroughly the merits of his proposition that we reproduce them in full, as follows:

Whom Do They Reach?

The circulation of the new Columbus directory will be 10,900; of which 5,700 are in 5,200 residences (including 300 rural and suburban, and 200 hotel apartments); 4,800 in 3,200 business establishments; 200 in Franklin county exchanges; 200 for reference in outside exchanges.

Of the Franklin county directory 2,400 go into village and farm houses and 150 into village and rural business places outside of the Columbus exchange limits.

In quality, this circulation is of the very best.

Additional telephones are being connected and new directories put into use every day.

All the home family, all the business family, take occasion to refer to the book, thus multiplying its apparent circulation five to ten fold.

Many transient visitors refer to the telephone directory.

How Are the Books Used?

By telephone patrons for obtaining numbers, from one to a dozen or more times every day; also by regular and transient users frequently for obtaining firm names, street addresses, business classifications, etc.

Various features of the books—including the advertising—are frequently examined during periods of waiting for calls or for lines to be freed from the busy test. The Columbus directory is an attractive one.

Look at a dozen at random and see if they show signs of wear.

Is the Advertising Well Placed?

There are two general methods of placing advertising. One is to get it into the reader's way, as in city directories, on billboards, in "paid locals." The other is to put it where the reader can look for it when he is in the mood, as in the backs of magazines.

Advertising standing systematically next to, but not part of, the reading matter, combines the advantages of both with the faults of neither. In these directories the reading matter and the advertising matter are each as distinct and as plain as in the *Century Magazine*. *The Ladies' Home Journal*, with a circulation of a million, and commanding the highest advertising rates, has clung to a clumsy form for the purpose of getting advertising and reading matter side by side.

How Long Do the Books Last?

Probably six to nine months. They are used just as much on the last day of their life as on the first. There is no break between issues.

What is the Price?

For a quarter-page in the Columbus directory, $12.50 per issue; in the county directory, $5.00 per issue.

How Does This Compare With Other Advertising Costs?

For general publicity, as for Sapolio, Uneeda Biscuit, Douglas shoes, sought to be sold to everybody everywhere, it is a very favorable rate. For those to whom the business or household telephone subscribers form a select list, the price is a tenth to a fifth of the cost in other select mediums. These comparisons are figured on the actual space; not taking into account the very important consideration that each quarter-page is complete and separate. Size in advertisements is relative; the page before your eyes is larger than Memorial Hall from the street; and the quarter-page, if it has no competition, is just as big.

The amount for the Columbus directory approximately will pay for a week's time of a solicitor; for a thousand circulars—usually of extremely brief existence; for one street car card; for a little window trimming; for a very few signs, novelties, calendars. For effective billboard, newspaper or magazine advertising, the amount is not a drop in the bucket.

To Whom Should This Directory Advertising Appeal Most Strongly?

To the sellers of all products used in offices—because it reaches practically every office of consequence.

To the sellers of all high grade household furniture and supplies—because it reaches most of the best houses.

To the sellers of all farm supplies. If there are 10,000 farm houses in the county, and these directories are in 2,600 of them, it is plain that these are the households that have the best purchasing power.

To the buyers of all farm products, dealers in feed and grains, in vegetables and fruits, in horses and cattle, in poultry and eggs. They can in no other way make themselves so well known and so easily accessible to those who have for sale what they would buy as by this manner of advertising their business and their telephone facilities.

To the sellers of all factory supplies.

To all furnishing service to offices or business houses, as accountants and insurance agencies.

To all business that have special departments of service or merchandise not ordinarily associated with the name.

To new businesses seeking to establish their names before the public.

To all who solicit or welcome telephone orders.

Remember that this is the only advertising which is sure to be kept in the home.

PROVINCE OF SASKATCHEWAN, CANADA, MAKING TELEPHONE INVESTIGATION.

IN an endeavor to ascertain the attitude of the various municipalities in the province in relation to private or government owned telephones an investigation of conditions in the province has been instituted and a circular mailed by Mr. Francis Dagger to the clerk of each municipality asking the following questions:

1. Name of the company or companies furnishing telephone communication in your municipality?
2. Number of telephones at present in service?
3. Rates charged, (a) business, (b) residence?
4. Have you long distance communication? If so state distances and rates to a few points.
5. Have the farmers in your vicinity any telephone service? If so state rates.
6. To the best of your knowledge, what is the general feeling in your neighborhood toward the company operating and the rates charged? Are the people satisfied or otherwise?

Many replies have already been received and in a very short time the investigating committee will have sufficient information of this nature to enable it to deal with the situation to the best advantage.

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GRAY PAY STATIONS PAY WHY?

Quick Service and Low Maintenance

With Gray Stations You Simply Drop in the Coin

NO LEVERS OR SPRINGS

GRAY TEL. PAY STATION CO.

HARTFORD, CONN.

SEND FOR OUR CATALOGUE ✒ IT'S WORTH HAVING

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—200 magneto telephones. Have changed system to common battery, therefore must sell these telephones at once very cheap. Oswego Co. Independent Telephone Co., Fulton, N. Y. 949

TELEPHONE PLANTS WANTED

WANT to purchase a telephone plant in Ohio or Indiana with from 300 to 600 subscribers. Address, Box 961, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York City. 961

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Position desired by cableman with 10 years' experience pulling, splicing, etc. Can perform duties required of wire chief for small exchange. Correspondence solicited. Address Box 960, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 960

WANTED—Six good common battery switchboard installers. Give reference and state fully experience. Also state rate of wages per hour expected. National Telephone Co. of West Virginia, Wheeling, West Va. 962

EXPERIENCED telephone accountant and auditor desires position with more room for advancement. Can systematize your business and give you results. If looking for thoroughly reliable and competent man, I can suit you. Address, Box 963, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 963

WANTED.—Position in Engineering or Switchboard department by technical and practical young man. Single and can furnish best of references. American or foreign service. Address Box 951, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 951

WANTED—A position with a progressive Independent Telephone Company located in the South or Southwest. Have had 18 years' experience and at present have charge of three large central energy plants. Married, 35 years of age, and am an experienced organizer and systematizer. Address Box 954, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 954

WANTED--Continued

WANTED—Positions desired by two first class telephone engineers who are experienced installers of switchboards, underground and aerial systems. At present employed as general and assistant general superintendents. Both are desirous of locating in the South or Southwest. Address Box 955, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 955

WANTED—$5,000, 5 to 10 years' time, 6 per cent. interest. Interest payable annually or semi-annually. Security gilt-edge. Address Box 945, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 945

WANTED—Position by competent young man as manager or superintendent of telephone exchange, not over eight hundred subscribers. Six years' experience. Good habits; best reference furnished. Address, Box 946, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 946

CABLE SPLICER wants position. Several years' experience in Telephone, Telegraph and Power Work. Best of references. South or West U. S. preferred. State wages, etc. Address Box 942, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 942

WANTED—Position. Thirty-three years of age, with 4 years' technical training; 7 years' practical experience, from hole digging to Long Distance Construction, Exchange Installation and Management. Address Box 943, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 943

That advertiser has much to learn who is deterred from advertising in a medium because he does not like its policy—its religion or its politics.—*Printers' Ink.*

GENERAL STORAGE BATTERY CO. BIJUR "HIGH DUTY" 90 NEW YORK

STORAGE BATTERIES

FOR TELEPHONE WORK

Should be BIJUR HIGH DUTY

Our Cat. A Tells Why .. .. ..

General Stor. Battery Co.

42 Broadway, N.Y. Works: Boonton, N.J.

See our exhibit at the Electrical Show, Chicago, January 13-25, 1908.

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Recent Telephone Patents

STEP-BY-STEP SELECTIVE LOCKOUT.

J. H. Blythe, Denver, Colo., patent 868,594, Oct. 15, 1907.

An arrangement of two electromagnets, an armature attached to a pawl for the purpose of causing the movement of a ratchet wheel, a wheel having a number of threaded holes in its outer rim with a metallic pin inserted into one of these holes, a spiral spring and suitable contact springs constitute the apparatus described in this patent.

The actuation of the electromagnet is governed by the central office operator who by impressing upon the telephone line a predetermined number of electrical impulses causes the ratchet wheel to turn a sufficient distance to bring the metal pin between the contact springs for the instrument desired, thus securing electrical connection with this instrument to the exclusion of all others connected to the line.

AUDIPHONE OR LOUD SPEAKING TELEPHONE.

J. A. Baker, Sequin, Texas, patent 868,245, Oct. 15, 1907.

The device described in this patent comprises a number of concave or cup shaped permanent magnets, having electromagnets secured axially within them. Over the pole pieces of the electromagnets and upon the edges of the cup shaped magnets are placed soft iron diaphragms.

The windings of the electromagnets are serially connected in relation to each other and to the line.

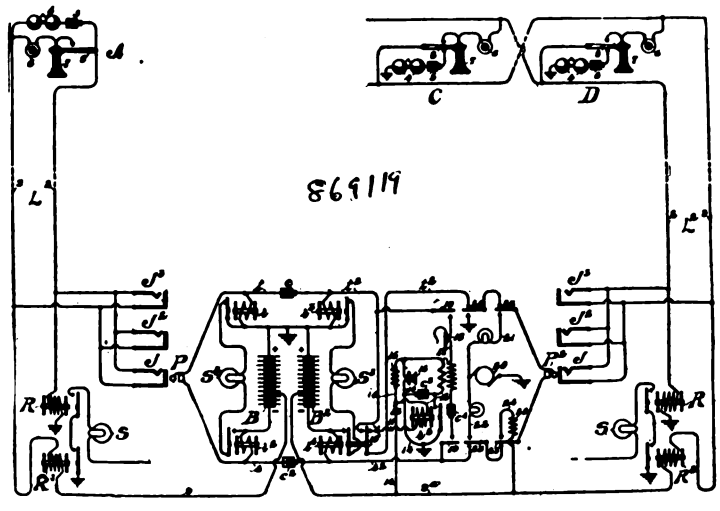
Sound amplifiers on the principle of the megaphone are provided directly before each of the diaphragms. The inventor's object is to secure an instrument in which the sound waves as set up by the customary telephone receiver will be multiplied according to the number of magnets so arranged and further directed by the amplifiers in a uniform direction so as to cause the sound to be heard several feet from the instrument.

TELEPHONE SYSTEM.

Harry G. Webster, Chicago, Ill., patent No. 869,119, October 22, 1907, assigned to Kellogg Switchboard & Supply Co,

The line circuit has two relays, R and R^2, one in series with each side of the line and both of comparatively high resistance and impedance. When a subscriber calls, both are operated and the line signal illuminated. The insertion of the plug causes the shunting of relay R by supervisory relay r and of relay R^2 by relay r^2. The line signal is thus put out.

When the operator rings either party on the line by the operation of key springs 26 or 23, she does not operate the line signal for the following reasons: When the party on the tip side

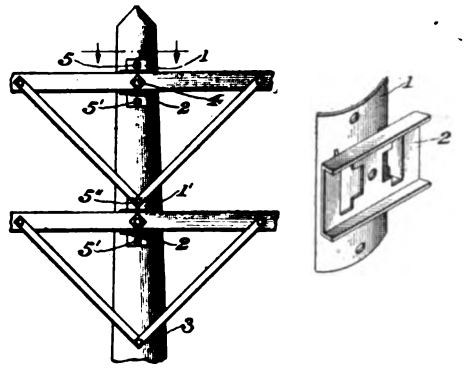


of the line is rung by the use of springs 23, the sleeve spring connects a shunt path through the non-inductive coil winding 25 around the relay R^2. When the other party is rung, the ground on the tip side shunts relay R, preventing its operation.

SUPPORT FOR CROSS-ARMS.

Ernest E. Yaxley, Chicago, patent No. 868,591, October 15, 1907, assigned to Steel Gain Mfg. Co. of Chicago.

The subject of this patent is a support for cross-arms comprising a metallic pole gain and a pole plate for supporting it,



substantially of the forms shown in the accompanying illustrations. The pole plate 1 is punched with slots extending vertically, and through these are passed wings stamped out of the cross-arm plate 2. When the device is set in place, these wings penetrate the wood-work of the pole and form a support in addition to that afforded by the central bolt 4 passing through the cross-arm and cross-arm plate and lag screws 5 and 5', etc., passing through the pole plate. The pole plate is curved to conform to, the surface of the pole. In the preferred form the pole plate extends vertically along the pole for the entire distance between cross-arms, making a continuous supporting device for the cross-arm plates. Braces may be used in the usual manner.

CABLE HANGER.

Thomas A. Walsh, Yonkers, N. Y., patent No. 868,511, October 15, 1907.

The cable hanger described in this patent consists of a single piece of metallic ribbon with one broad end containing a slot. The other end has lateral wings or extensions. In using the device the end containing the slot is placed close to the cable and the band wrapped around the cable, passed through the slot, up over the messenger in the reverse direction to that which each took in going over the cable, down and through the slot again. When the weight of the cable is placed upon it, it forces the lateral projection into engagement with the sides of the slot, thus locking the device. To prevent sliding of hangers along the cable, the hanger is provided with a circular perforation at the point where the cable presses upon it. The weight of the cable causes the formation on its surface of a stud projecting through this small hole.

METHOD OF AND APPARATUS FOR TRANSMITTING ELECTRICAL ENERGY.

Walter C. Yeatman, Chicago, Ill., patent No. 863,247, August 13, 1907, assigned to A. T. and T. Co.

The object of this invention is to reduce the attenuation and loss of efficiency in the transmission of alternating currents by neutralizing the capacity effect in cable and open wire lines. The inventor provides conductors for this purpose having a central core of metal of high conductivity, such as copper, surrounded by a sheath of magnetic material of high permeability, such as electrolytic iron. The latter is preferably constructed about the core by the process of electrolytic deposition. The improvement in transmission which it is claimed may be expected in a 100 mile cable, No. 16, B. & S. gauge, by the use of conductors constructed in this manner is indicated by mathematical formulæ which the inventor presents in his specifications.

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THE EXCHANGE MANAGERS' AND THE SUBSCRIBERS' FLYING WEDGE

IRRESISTIBLE

IRRESISTIBLE

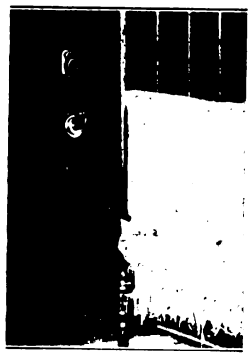
THE DEMAND FOR

Easophones

See what they mean in the bed-room.

No objectionable features.

In case of fire! Illness! Burglary! Calls at night! Invaluable in case of emergency!



Bell box is out of sight.

Switch hook box and instrument are small, out of the way, attractive and practically indestructible.

The one type of phone never in trouble.

FOR COMMON BATTERY & MAGNETO SYSTEMS

Write for Bulletins No. 101 and No. 102

THE WIRE & TELEPHONE CO. OF AMERICA, Rome, N. Y.

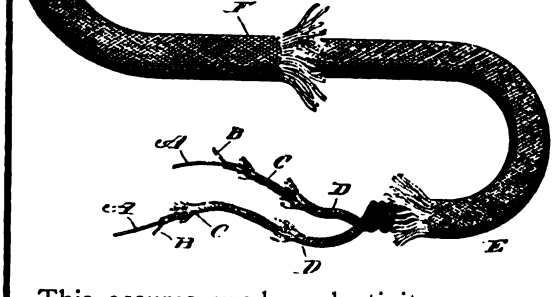
Manufacturers of telephones, telephone supplies, bare copper, annunciator, magnet and rubber covered telephone wire.

See our exhibit at the Electrical Show, Chicago, January 13-25, 1908.

The Conductors or Premier BB Steel Cords

Are made of specially prepared, hard drawn, steel wire. This assures flexibility and durability.

And owing to the high resistance of the steel wire a winding of pure copper wire is applied to reduce this high resistance.



This assures good conductivity.

Each conductor has a triple insulation, the first consisting of a serving of silk, the second of a serving of cotton and the third of a braiding of waxed cotton. These assure perfect insulation.

And these features, together with our new prices, which are in your favor, assure satisfaction to the purchaser.

It is to your interest to write us to-day

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton St., Chicago

Lightning Effect No. 2

Sudden Static Induction Due to Cloud Lightning

WHEN a positively charged cloud passes over a telephone line the line and ground carry a negative charge, that on the line being greater than that of the ground as the line is in closer proximity to the cloud.

¶ As the cloud approaches the line the potential of the line against ground rises until a discharge takes place from the ground to the line, thus charging the line negatively.

¶ Then as the cloud passes away from the line, leaving it negatively charged, the line will discharge to ground as the static accumulation is no longer held or bound by the positive charge of the cloud.

¶ Thus, during the approach and departure of a thunder cloud, discharges may occur between a line and ground, due to an accumulation of electrostatic potential difference by induction from the cloud.

¶ These discharges are dangerous, in that they are quite liable to damage the subscriber's station and central office equipment as well as cause the shattering of poles.

SKY ROCKET ARRESTERS

provide for these charges by arranging a discharge path so that the discharges pass harmlessly without producing other disturbances.

¶ Their function on a telephone line is the same as the overflow outlet in water systems.

¶ And they are just as simple in construction and operation, and

THEY ALWAYS PROTECT.

Cost Small—Savings Large

Write to-day for sample

CHANCE MFG. CO.

CENTRALIA, MO.

EFFECT No. 3 NEXT WEEK

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What the Manufacturers Are Doing

THE CLEMENT AUTOMANUAL EXCHANGE SYSTEM.

AN operator at the central office, when a subscriber calls on a line connected to the new Clement Automanual Exchange receives from him a statement of the number desired, and arranges for the prompt completion of the connection by automatic switches. She does this by simply setting up, on a keyboard resembling a typewriter keyboard, the number of the line desired, and immediately the switches take up the connection and complete it automatically. From the time she has pressed the last key the call is under the control of the subscriber.

This method of handling connections has been developed up to its present state of completeness under the direction of Mr. Edward E. Clement, the well known patent engineer. After leaving the patent office where he was for several years in charge of all work on telephony, Mr. Clement, with the assistance of Mr. Jas. B. Hoge, organized the National Engineering Corporation, and, with the backing of this company, has for some time past been conducting experimental work, and later on the actual manufacturing of apparatus, at Baltimore, Md. Recently reasons of economy of production and distribution led to a consolidation with the North Electric Company, of Cleveland, O., by which the latter organization acquires complete control of the United States and Canadian patents on the Clement Automanual system. The North Electric Company is now ready to put the system upon the market, and is prepared to give out information which covers a number of very interesting details, and sets forth some strong claims for the efficiency and economy of the system.

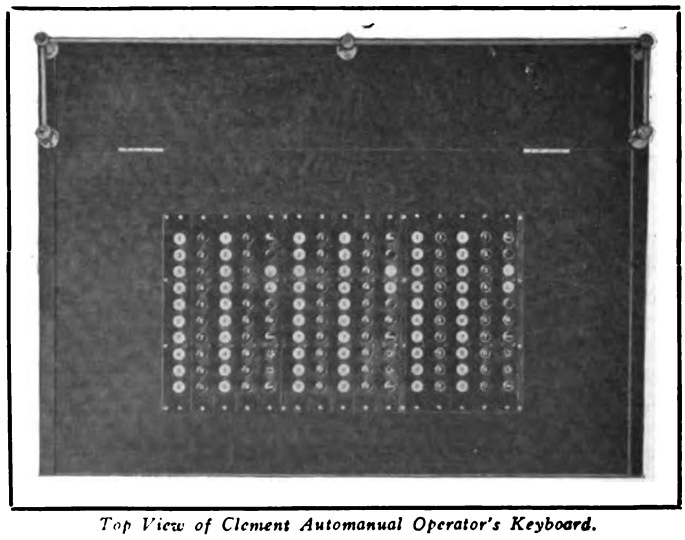
Three Switching Positions, Clement Automanual System.

All special devices in the "Automanual" system are grouped in the central office. The subscriber's instrument, line and protectors—in fact everything as far as the office side of the main frame—are similar to those used in standard common battery systems. In the central office the equipment is divided into two parts, the operators' equipment and the automatic switching apparatus. Each operator's position is equipped with keys for controlling the operation of automatic switches. Calls are received one at a time, the keyboard becoming available for the reception of a second call only when the first call has been sent through. Only "A" operators are employed, the switching and relay equipment taking care of incoming and outgoing trunk calls without any thought on the part of the operators or subscribers. In practice, arrangements are made so that as soon as a subscriber takes down his receiver he is connected to an idle operator, who takes from him the number desired and sets it up, figure by figure, on the keys. Her work on any call is finished as soon as the last figure is struck, and she is ready for another. Meanwhile the subscriber has been connected to the switches and disconnected from the operator; the switches commence to operate, and by their automatic movement connect his line to the one corresponding to the number set up on the operator's keyboard. The operator is no longer connected to either line, and so secrecy is assured. Arrangements are made for giving a signal to the calling party if the desired line is busy, for the calling of subscribers on selective party lines, and other contingencies met in practice.

Mr. C. H. North, President North Electric Co.

The North Electric Company states that the talking circuit during conversation is clean and clear, being essentially a duplicate of the standard bridged battery circuit employed in modern manual systems. A system of control is provided, whereby the calling subscriber can clear out at any time before the called subscriber answers, and after that the called subscriber can disconnect his own line, so that the line cannot be tied up through any misunderstanding or malicious act.

The hanging up of the receiver at the close of a conversation causes all connective apparatus to be automatically restored to normal position, the clearing out being practically instantaneous. To clear out and make a second call, it is stated that a momentary depression of the switch hook is sufficient, on account of the rapid action of the automatic apparatus. Provision is made for the equipment and operation of desks for chief



Top View of Clement Automanual Operator's Keyboard.

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THE CALCULAGRAPH

SAVES MONEY

Because it insures collection for every minute and fraction of a minute that your toll lines are in use. Its record is infallible because

IT MAKES NO CLERICAL ERRORS

Get Our Reason Why Booklets.

CALCULAGRAPH COMPANY

1437 JEWELERS BLDG., NEW YORK CITY

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.

SIMPLICITY

Note how easy it is to splice pairs when you use HARGIS CABLE SPLICING JOINTS. Note how easy it is to get into the joint in case you have to test out for trouble.

If you are stringing several lengths of cable and a storm blows up, you can get your cable ends into a moisture-proof HARGIS JOINT in no time and thus prevent moisture from getting into your cables. When the weather clears up, your lineman can go out and splice the pairs in each joint.

While an expert cable splicer is rigging up his platform, etc., to start to work on a horizontal joint, a lineman can wipe in a HARGIS JOINT. The lineman can have all his pairs spliced and be off to the next job about the time the expert splicer would be ready to begin wiping the second end of his horizontal joint.

Making a splice with a HARGIS JOINT is so easy that you don't need a cable platform. There is no need for a drip pan to catch the paraffine, because the HARGIS JOINT is submerged in the paraffine pot, and there is no waste. The moisture has to go out. No uncertainty.

SEND IN YOUR ORDER TO-DAY

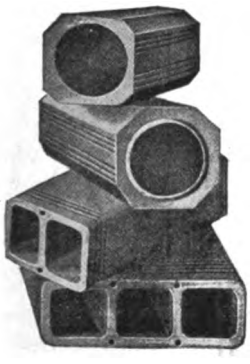
W. N. Matthews & Brother

Manufacturers of Patented Money Saving Specialties.

214 North Second Street ST. LOUIS

Branches: New York and San Francisco.

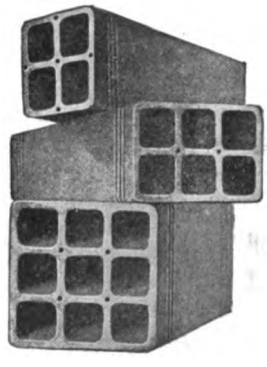
See our exhibit at the Electrical Show, Chicago, Jan. 13-25, 1908.



VITRIFIED

CLAY CONDUIT

SINGLE and MULTIPLE DUCT



IMMEDIATE DELIVERY ON ALL STANDARD SIZES

Factories: New Jersey, Pennsylvania, Ohio

Standard Vitrified Conduit Company

Main Offices: 39-41 CORTLANDT ST., NEW YORK, N. Y.

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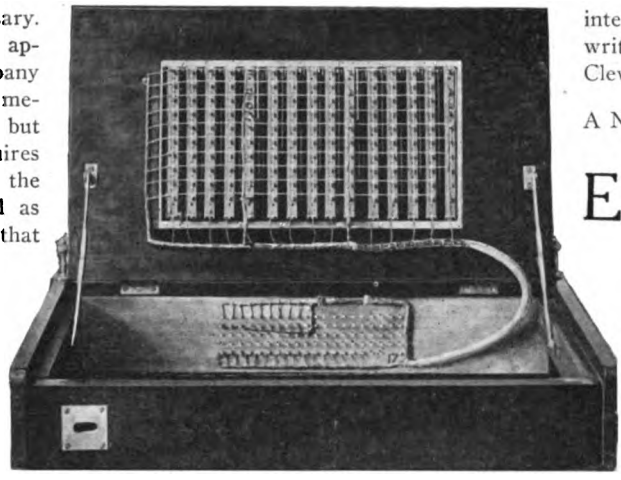
operators, monitors, wire chief, etc., according to the requirements of particular exchanges. In case of toll calls, and calls for operating officials of the exchange, the operator sets up the numbers in the regular way, no departure from routine being necessary.

In the actual working out of the apparatus it is claimed that the company has been able to secure not merely mechanical and electrical efficiency, but also to provide a system which requires a minimum amount of space in the switching and power room, as well as in the operating room. It is said that all the operators for a 10,000 line exchange can be accommodated in a room 25x20 feet. The North Electric Company gives as the standard for the average time from the removal of the subscriber's hook to the completion of the operation of setting up the number a period of 2.9 seconds, and with this as a basis estimates that the system will enable an operator under actual working conditions to handle a maximum of six to eight hundred calls per hour, the theoretical maximum being about 1,200 calls per hour. On this basis the company states that a 10,000 line exchange should be handled by 17 to 25 operators and smaller offices in proportion. It is said that all of the contingencies met in manual practice, such as changed numbers, disconnected telephones, etc., which are provided for by marking the multiple, are fully arranged for in the "Automanual" system.



Clement Automanual Keyboard, Opened to Show Wiring.

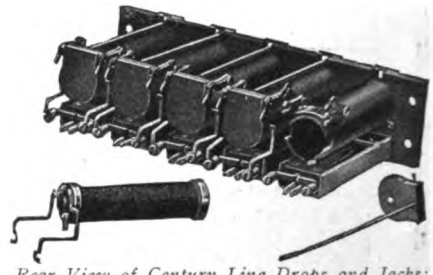
Front View of Century Line Drops and Jacks.

The manufacturers of this system state that they are prepared to demonstrate many important advantages, among the most interesting of which they enumerate the following: "Saving in 'A' operators' salaries of from 40 to 80 per cent.; saving in 'B' operators' salaries of 100 per cent.; low maintenance charges; quick service; accurate service; secret service; absolute control of connections by subscribers, and no interruptions during conversation; good trunking service; simplicity of operators' duties, which makes them easy to learn; absence of necessity for students' boards; adaptability of system to standard lines and common battery telephones; automatic ringing, which saves time and labor in the central office, and insures an absence of ringing troubles due to lack of uniformity; impossibility for an operator to show favoritism to particular subscribers; absolute control of line by called subscribers; simplicity of design of operator's switchboard; uniform distribution of calls among operators; provision for concentration of calls at one or two desks during dull periods."

Further information concerning this interesting system may be obtained by writing to the North Electric Company, Cleveland, O.

A NEW MAGNETO CALL SWITCHBOARD.

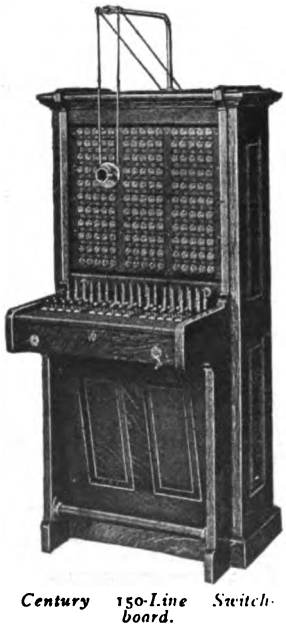
ENTIRELY new features intended to increase the efficiency of magneto telephone service and decrease the maintenance cost are said to be included in a recently designed board which is manufactured by the Century Telephone Construction Company, of Buffalo, N. Y. The cabinet is carefully constructed of well-seasoned, quarter-sawed oak, finished in golden oak and highly polished. The back of the cabinet, also of oak, is paneled and made removable, and the panel below the key table is also removable. The key table is made three-ply to prevent warping. It is hinged to the plug shelf, and provided with a spring lock. The plug shelf and the panel immediately below the clearing-out drops are covered with oak-tanned leather, finished to match the cabinet.



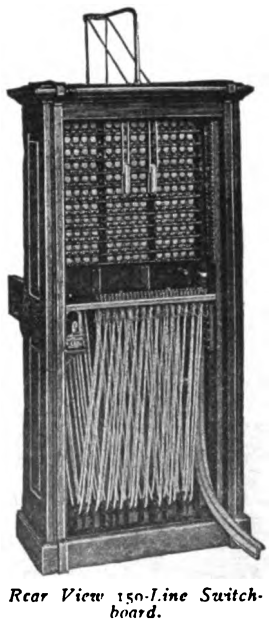
Rear View of Century Line Drops and Jacks; One Drop Coil Removed.

The cabinet is made in units of one position each, the end panels being separate, so that any number of sections can be combined and still retain the appearance of a complete unit. Suitable division panels are provided between sections where more than two positions are included in the switchboard.

The line equipment includes self-restoring drop signals of the tubular, removable coil type mounted in combination with the line jacks in strips of five each. The switchboard can be equipped with either series or bridging drops, the bridging signals being also made for use with telephones equipped with push buttons. Line drops are mounted immediately above their corresponding jacks. The drop shutter is automatically restored upon inserting the plug into the jack, the signal being completely restored before the plug makes contact with the jack springs. The restoring device is exceedingly simple, including only a short sleeve pivoted across



Century 150-Line Switchboard.



Rear View 150-Line Switchboard.

Century 100-Line Magneto Board.

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NEW ERICSSON ALL STEEL TELEPHONES

Compare them with your wooden instruments.

They are practically indestructible—are your wooden ones?

The cabinet will not bend, warp, split or crack—will your wooden ones?

They cannot catch fire from lightning—do your wooden ones?

The finish is *elegant* and *lasting*, so was the finish on your wooden ones at first—was it lasting?

The finish will not scratch easily—is that true of the finish on your wooden instruments?

The lightning arrester is entirely encased in steel, all terminals, binding posts and wires are concealed. All wires are heavily insulated and protected by rubber bushings where they pass through the cabinet. Trimmings are nickel, lacquered to prevent tarnishing and many more desirable features.

These telephones are absolutely the smallest manufactured to-day having standard equipment and space provided for two standard dry cells.

Write department "B" to-day for Booklet "B," which contains cuts, description and prices of all equipments, both Magneto and Common-Battery Systems.

It's the "New Ericsson" and is supreme.

L.M.ERICSSON TEL.MFG.CO.
BUFFALO, N.Y.

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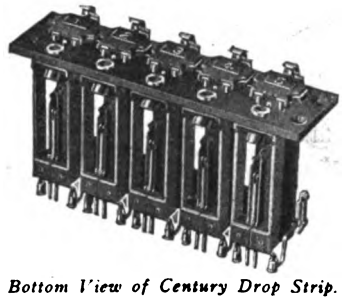
the path of the plug immediately in front of the jack springs. To this sleeve is pivoted a pin normally resting behind the lower edge of the drop shutter, the shutter when in a calling position being in the direct path of this pin. The plug, upon entering the jack, causes the pivoted sleeve to assume a horizontal position, thereby pushing the pin forward and thus causing the shutter to be restored to its normal position.



Bottom View of Century Drop Strip.

The drop coils are wound directly on the core, from which the winding is carefully insulated. The coil winding terminates in German silver connectors attached to the head of the spool. These connectors are forked on one end and engage screw connections on the jack springs. The coils can be removed within a few seconds' time by disconnecting the drop from the jack, removing the armature by lifting the latches on the armature bracket, and then withdrawing the coil. A small catch is provided on the coil to hold it securely in the proper place in its shell.

The jacks are self-contained and include tip and sleeve springs, the sleeve of the jack forming no part of the circuit. The springs are insulated from each other with hard rubber and are provided with platinum contacts.

The clearing-out drops bridged across each cord circuit are constructed in a similar manner to the line drops, but are not self-restoring. They are so mounted as to appear immediately behind their corresponding cords. Where an exceptionally efficient clearing-out signal is desired cord circuits can be equipped with duplicate clearing-out drops, there being one used with each cord. These signals can only be operated over the cord to which they are connected. The circuit is so arranged as to make it impossible to ring past either signal and the manufacturers state that the signal is reliable even when the cords are connected to series or exceptionally heavily-loaded bridging lines. This signal overcomes the ringing in a subscriber's ear or the recalling of a subscriber when ringing off. Where double clearing-out signals are included, the two drops of each cord are mounted one above the other.

Clearing Out Drops Used in Century Magneto Board.

Each regular cord circuit also includes a listening key and ringing key for ringing on both cords. When necessary, a repeating coil and key for cutting it in or out can be included.

The ringing and listening keys are mounted in combination on one face-plate and so arranged that all parts are easily accessible. The frame of the key is made of brass and is finished in nickel, the face-plate being highly polished. The key springs are made of German silver and provided with platinum contacts. All springs are carefully insulated from each other with hard rubber.

The operator's equipment includes a suspended transmitter of the platinum electrode type, and a light-weight, adjustable head receiver with leather-covered head band. The receiver terminates in a plug and cord, the cord being reinforced at the plug end and covered with silk braid. An operator's jack is provided, including transmitter battery cut-off springs. An induction coil, designed to give the highest efficiency with the transmitter and receiver used, is also included.

Century Ringing and Listening Key.

The ringing equipment includes a powerful five-bar hand generator with Tungsten steel magnets and laminated soft iron armature wound with silk-covered wire. A switch is provided for cutting in either power or hand generator ringing machine. This switch is mounted on the face of the switchboard, convenient to the operator.

The drops carry reliable night bell contacts wired into a night bell circuit which includes a round pattern vibrating bell, two cells of Columbia dry battery and a switch for cutting the bell in or out of circuit. The switch is mounted on the face of the cabinet within reach of the operator.

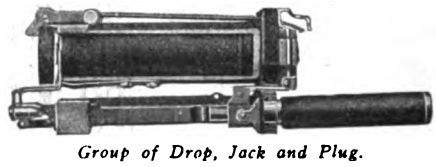
All of the wiring in the switchboard is done with silk and cotton insulated tinned copper wire, formed up and laced into cables of the proper size. All cables are thoroughly boiled in beeswax to exclude moisture. All connections are carefully made and soldered without the use of acids, salts or paste. The line cable wires are colored in accordance with a predetermined code to facilitate the proper location of the different circuits. This cable is of sufficient length to extend ten feet from the base of the cabinet.

Any further information desired may be obtained directly from the manufacturers of the switchboard, the Century Telephone Construction Company of Buffalo, N. Y., and Kansas City, Mo.

View of Drop and Jack, Showing Restoring Device.

HOW TRUMBULL SWITCHES ARE ADVERTISED.

PEOPLE who want to learn about knife switches, the different types which are obtainable, the conditions under which they are made and the features about them which make them give good reliable service, should write for "Trumbull Cheer." It is an interesting, attractive and useful magazine published by the Trumbull Electric Manufacturing Company, Plainville, Conn. Its primary object is to put before its readers information about new lines of Trumbull material which are continually being offered to customers and to emphasize the interesting features of the older, established lines. This information is conveyed by the publication of regular price lists and discounts, illustrations showing views of the switches and, in each issue, a certain number of descriptive articles of a more or less technical nature showing various matters which the manufacturer believes will interest his customers. For example, telephone companies which are desirous of learning about the effect of recent rulings of the underwriters upon power switchboard practice will find information in the November issue covering this point in connection with switches for alternating current work. The November issue also contains a detailed list of the Trumbull "A" line of switches. Panel boards and switchboards are also advertised in addition to other features of the company's large list of products.



Group of Drop, Jack and Plug.

Although the booklet carries useful information for the engineer and the man who does the buying, there is nothing heavy about it; its cheerful tone in general justifies the title, as it always contains a considerable number of bright epigrammatical sentences and a few lines of lively verse and reflections on business and general conditions. The booklet is printed throughout in two colors on heavy coated paper and so illustrated with caricatures and half-tone cuts as to present a very attractive appearance. Telephone men will not only find the booklet interesting, but will be able to keep posted on switches by having their names placed on the mailing list, which will be done on application to the Trumbull Electric Manufacturing Company, Plainville, Conn.

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AJAX—THEN AND NOW

NOT "NOW AND THEN" BUT "AJAX ALWAYS"

THEN—

Ajax, the strong, bold warrior, after the duel between Hector and Patroclus, stands defending the body of Patroclus. Jove enveloped the face of heaven with a dark cloud, the thunders roared and lightning flashed. Ajax, looking for a messenger to send and tell Achilles of his friend's death, exclaimed in those famous words of Cowper:

"Father of heaven and earth deliver thou
Achaia's host from darkness; clear the skies;
Give day; and since thy sovereign will is such,
Destruction with it; but, oh, give us day."

Jupiter heard the prayer and dispersed the clouds.

This Cut on All Genuine Ajax-Cells.

NOW—

There is something in a name. It does not make the article better, but it establishes a standard and in our Ajax Dry Battery is suggestive immediately of high strength, recuperative power, long life. All batteries are not alike. Because a battery is advertised to you in your every mail it is not better. You are paying for all that advertising. All quality in the Ajax, not one cent for the name. The battery on which we are willing to put our name, furnish with our Telephones and recommend to telephone exchanges. You want something better than the ordinary "Supply house" battery. You do not want to pay a fancy, factory-made price. Try a barrel under our special offer now, 15½ cents each in barrel lots, especially attractive yearly contracts. Order through our nearest office.

Central Telephone & Electric Company

Makers of High-Grade Telephone Apparatus

Main Office and Factory:
2131-37 LUCAS AVE., ST. LOUIS, MO.

Dealers in Telephone Supplies (Exclusively)

120 Liberty Street, New York City
237 Commerce St., Dallas, Texas

"Arrester"

"Leave not that to chance, which foresight might provide for or care prevent."

HE-IS-A-TOUGH CUSTOMER

But we have him safe!

WE will furnish the "Arrester,"
YOU furnish the "Good Ground."

REMEMBER! without "Good Ground" "Arrester" has no place to take him.

SUMTER TEL. MFG. CO., SUMTER, S. C.

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The Week's Messages

NEW COMPANIES.

BROWNSTOWN, IND.—The Home Telephone Company has been incorporated with a capital stock of $20,000. Its object is to build, equip and operate a telephone plant in the town of Brownstown and throughout Jackson county. The directors of the company are C. E. Brown, W. H. McPherson and C. F. Robertson.

HAGERSTOWN, IND.—Plans are being considered by the citizens of Hagerstown for the formation of a mutual telephone company. Among those actively interested in the new project is Aaron Wollard.

DUBUQUE, IA.—The Standard Construction Company, which intends, among other things, to construct telephone lines, has been incorporated with a capital stock of $75,000, divided into 750 shares of $100 each. Its principal place of business is to be located at Dubuque, and the following officers and directors have been elected: D. C. Glasser, president and treasurer; L. S. Needham, vice-president; O. M. Lorenz, secretary; directors, Henry Kiene, D. C. Glasser, J. R. Guthrie, L. S. Needham and B. A. Scott.

SERGENT, KY.—Plans are under way for the incorporation of the Sergent-Ola Telephone Company, which expects to construct a line from Sergent, by way of Colly, to Ola, Ky. Work on the line is to be commenced at once under the management of W. B. Webb.

SERGENT, KY.—Among the newly organized Independent telephone companies is the Letcher County Telephone Company, of Sergent, Ky. The company has an authorized capital of $2,000, and expects to install an up-to-date plant at this city. Among the incorporators are J. E. Venters, Booker Venters, W. R. Webb and others.

BRYANT POND, ME.—An Independent telephone company is being organized in this town, and money has been raised for the construction of a number of rural lines.

FLINT, MICH.—An Independent telephone company, which is to be operated in conjunction with the Valley Telephone Company and the rural telephone exchanges throughout the county, is being formed at Flint. J. W. Martin, of Detroit, is back of the new enterprise, and it is understood that he will endeavor to obtain a thirty year franchise in Flint.

KALAMAZOO, MICH.—Articles of incorporation have been filed by the Kalamazoo Home Telephone Company, whose purpose it is to install a thoroughly modern telephone system in this city to be operated in competition with the Michigan State (Bell) Telephone Company. It has a capital stock of $500,000, of which four-fifths is common and one-fifth preferred, and the incorporators are: J. C. Owsley, Sharon, Pa.; Charles Greer, New Castle, Pa.; Charles W. DeVoe, Conneaut, Ohio; L. M. Uber, New Castle, Pa.; A. E. Rhodes, J. H. E. Porte, New Castle, and W. W. Hazzard, Cleveland, O.

LUTHER, MICH.—A rural telephone company, which expects to build lines from Luther to Bailor, Roush and Hoxeyville, is being formed at this city, and the following officers have been elected: President, H. W. Mitchell; vice-president, Stewart Lacke; secretary, Fred Lickert; treasurer, Frank Rockwell; trustees, O. W. Stringer and others.

SANTE FE, N. M.—It is very probable that within a short time long distance telephone connections will be established between Sante Fe and Estancia, Willard and other points in the Estancia Valley. Articles of incorporation have been filed by the Sunshine Valley Public Utility Company, which has for one of its objects the construction of telephone lines, and the following officers elected: W. A. Wilson, president; C. D. Ottosen, secretary; E. P. Davies, treasurer; H. A. Hart, general manager. The company has an authorized capital stock of $25,000, and it expects to at once commence the construction of its toll lines and exchanges throughout Estancia Valley.

FLORIDA, N. Y.—Articles of incorporation have been filed by the Florida Telephone Company. It has an authorized capital stock of $5,000, and the incorporators are George S. Vail, F. E. Tether, J. K. Ree and others.

HALLSVILLE, N. Y.—The Hallsville Telephone Company, which has a capital stock of $25,000, has been incorporated, and expects to install a telephone system at this city.

KNOXVILLE, O.—The Knoxville Rural Telephone Company, which has a capital stock of $3,000, has been incorporated by W. H. McClelland, James Alexander, J. H. Cooper and C. G. Winn.

PORTSMOUTH, O.—Plans are being considered for the formation of a stock company at Portsmouth, whose intention it is to install an up-to-date telephone system at that place. The promoters expect to start with a list of fifteen hundred subscribers.

CHOCTAW, OKLA.—Among the latest companies to file articles of incorporation is the Choctaw Telephone Company. The capital stock is placed at $1,500, and the incorporators are J. F. McIrwin, T. J. Rowlin and George P. King.

DILL, OKLA.—The Dill Farmers' Telephone Company, which expects to install and maintain a modern telephone plant in this city, has been incorporated with a capital stock of $10,000. Among these responsible for its formation are W. P. Ream, C. C. Hickman, of Dill, and W. C. Larner and G. L. Bishop, of Cordell.

SENECA, S. C.—Indications point to the formation of an Independent telephone company in this city, in which T. M. Lowery, president of the Chamber of Commerce, is to be largely interested.

LEOLA, S. D.—The Koto Mutual Telephone Company has been organized with the following officers: President, A. C. Moore; secretary, Stanley McElhorne; treasurer, William Hickman; trustees, E. Hickman, Joseph Bell and W. H. Woodall. The company, which has already constructed eight miles of line, expects to form connections with the Western Mutual Telephone Company at Leola later on.

NORFOLK, VA.—The Planters' Telephone Company, of Norfolk, Va., with a maximum capital stock of $5,000, minimum $1,000, has filed articles of incorporation, and elected the following officers: J. G. DeBaum, president; J. E. Hall, vice-president; V. Engel, secretary; C. M. Williamson, treasurer, all of Norfolk.

HAYTON, WIS.—A Farmers' Telephone Company is being organized by the citizens of Hayton, whose object it is to construct rural lines.

FRANCHISES.

SAN DIEGO, CAL.—A petition has been filed with the county board of supervisors by E. W. Scripps for a franchise to construct, maintain and operate a telephone system from San Diego to Miramar.

POCATELLO, IDAHO.—A franchise has been granted by the city council to the Fremont Independent Telephone Company to establish and maintain a telephone plant in Pocatello.

HAMMOND, IND.—Application for a franchise in this city has been made by the Inter-State Automatic Telephone Company.

MT. CLEMENS, MICH.—Application for a franchise at Mt. Clemens has been made by the Home Telephone Company of Detroit.

VERMILLION, S. D.—A franchise has been granted to ex-Governor Andrew E. Lee in this city. He intends to construct and operate a telephone system in opposition to the Northwestern (Bell) Telephone Company, whose application for a franchise was denied.

SALINA, UTAH.—Permission has been granted to the Forest Service of the United States Department of Agriculture to construct a telephone line from Salina to Fish Lake.

UINTA, UTAH.—The Uinta Telephone Company has applied to the county commissioners for a franchise permitting it to construct and operate a telephone system in Heber City and other parts of Wasatch county.

DEER PARK, WASH.—The Deer Park Telephone Company, represented by Louis Olson, A. M. Johnson, D. B. Throop and Antone Iversen, has been granted a franchise to construct a telephone system in Spokane, and work is to be commenced at once.

ALMA, WIS.—The Northfield Farmers' Telephone Company, which has just completed a telephone line in the city of Northfield, has obtained a franchise at Alma, and expects to extend its lines to that place at an early date.

GALESVILLE, WIS.—The Ettrick Farmers' Telephone Company, of Ettrick, has secured a telephone franchise at Galesville, and contemplates the installation of an up-to-date telephone exchange there in the near future.

ELECTIONS.

BENTON, ILL.—The following officers have been elected by the Franklin County Farmers' Telephone Company: J. J. Pearce, president; W. S. Means, vice-president; George Young, secretary; O. S. Martel, treasurer.

KEWANEE, ILL.—At the annual meeting of the Henry County Telephone Company the following officers were elected: President, Norman Shearer; vice-president, A. Cosner; treasurer, J. F. Nowers; secretary, M. M. Everett.

MORRISON, ILL.—The following officers have been elected by the Whiteside Farmers' Mutual Telephone Company: President, C. H. Mason; vice-president, H. L. Ewing; secretary, C. E. Johnson; treasurer,

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OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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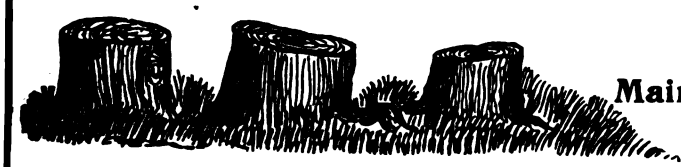
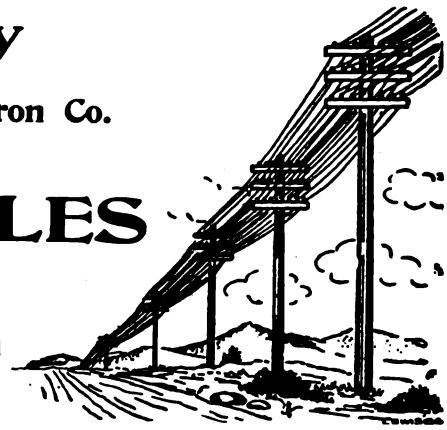


Yards from Maine to Washington



About the only place a "free puff" could be of any use would be in the technical papers that won't print it.—*Selling Magazine.*

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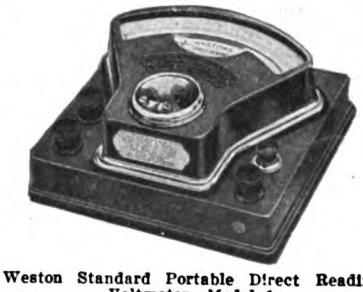

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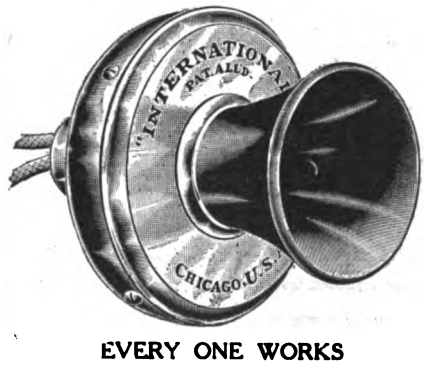

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The Week's Messages

R. E. Cochran. The directors of the company are R. E. James and Joseph Burns.

COLUMBIA CITY, IND.—At its regular annual meeting the Whitley County Telephone Company elected the following officers and directors: S. J. Peabody, president; George A. Pontius, vice-president; W. H. Magley, secretary and treasurer; directors, S. J. Peabody, Franklin H. Foust, Walter F. McLallen, George A. Pontius, A. A. Adams, T. R. Marshall, W. H. Magley, Robert Wiener and A. H. Krieg.

KNOXVILLE, O.—The following officers have been named by the Knoxville Telephone Company: President, C. B. Smith; vice-president, Geo. Grimm; secretary, James McClelland; directors, John Edmundson, T. G. Warren, Grant Wilkinson, Howard Cooper and John Cooper.

FINANCIAL.

ATLANTA, GA.—A petition has been filed by the Fort Valley Telephone Company with the Railroad Commission requesting the approval of an issue of $10,000 fifteen year 5 per cent. gold bonds, which the company proposes to sell for the purpose of making improvements and extensions in its system.

MARQUETTE, MICH.—A mortgage which provides for the issue of $25,000 worth of bonds has been filed by the Marquette County Telephone Company. These have been issued for the purpose of enlarging and improving the company's plant.

MISCELLANEOUS.

WINDOM, MINN.—The Windom Mutual Telephone Company's exchange at Westbrook has passed into the possession of a stock company of business men of that place, and it is probable that the plant will be materially improved under the new management.

OAKLAND, NEB.—The Oakland telephone line, formerly owned by A. A. Lenocker, has been acquired by the Avoca-Harlan Telephone Company, whose intention it is to greatly improve the service.

STRUM, WIS.—The Strum Telephone Company, which was organized some time ago, has filed articles of incorporation and elected the following officers: President, S. R. Anderson; secretary, Ellert Kleven; treasurer, E. Holte; manager, H. N. Robbie. Directors: P. H. Moltzan, Edw. Holden, P. Frodahl, N. C. Johnson, B. Hanson, L. O. Pederson and N. C. Nelson. It has a capital stock of $8,000.

NELSON, B. C., CAN.—At a meeting of the board of trade it was decided to take steps toward the installation of a telephone system to connect some of the rural districts. The proposition made by the British Columbia Telephone Company to supply telephones for fifty cents per month per subscriber, providing the subscribers build and maintain their own pole lines, was rejected as unsatisfactory. Address S. S. Taylor, Nelson, B. C.

TREHERNE, MAN., CAN.—At a meeting of the rural municipality of South Norfolk, it was decided to at once take steps for the establishment of a rural telephone system. The clerk was instructed to write to the provincial department of telephones, Winnipeg, Manitoba, to make inquiries regarding the initial steps to be taken. Address R. J. Mills, Treherne, Manitoba.

PERSONAL.

W. R. ELLIS has been appointed manager of the Johnstown, Pa., office of the Central District & Printing Telegraph Co.

M. F. HOSEA has been appointed superintendent of each of the following companies: The Central Home Telephone Company, the Independent Long Distance Telephone & Telegraph Company and the Long Distance Telephone & Telegraph Company, with headquarters at Louisville, Ky. He will be in charge not only of the detailed management of the exchanges of the above companies, but will also represent them in their advisory relations with the exchange companies in which they are stockholders.

W. C. LA RUE was elected superintendent of the Osceola Farmers' Mutual Telephone Co., of Osceola, Wis., at a recent meeting of the directors.

B. C. McCUNE, who for some time has been manager of the Johnstown office of the C. D. & P. Telephone Company, has been transferred to the Rochester and Beaver Falls district.

JAY MERCER, formerly located at Uray, Colorado, has recently accepted the position as manager of the Farmers' & Merchants' Telephone Co. at Pawnee Rock, Kans.

RALPH T. WOLFROM has recently been elected director and secretary of the Bellevue Home Telephone Co. at Bellevue, O.

Pushing Ahead

LANCASTER, CAL.—A new exchange has recently been installed by the Antelope Valley Telephone Company, and the company contemplates making many other improvements in its system.

BATAVIA, ILL.—Many extensions in its plant in this city are being made by the Inter-State Independent Telephone and Telegraph Company.

MONMOUTH, ILL.—Many improvements in its toll service are being made by the Monmouth Independent Telephone Company.

COLUMBIA CITY, IND.—The Whitley County Telephone Company, the successor of the old Home Telephone Company, and which has a capital stock of $100,000, is planning for a large number of improvements and extensions in its system.

MARION, IND.—Extensions in its system to permit of the addition of one thousand new telephones are being made by the United Telephone Company in Marion, and other extensions are also being considered.

HORTON, KAS.—The lines of the Horton Mutual Telephone Company are to be materially extended, and its plant otherwise improved.

WHITESBURG, KY.—The Whitesburg Telephone Company expects to build a double line from Whitesburg to Big Stone Gap, Va., a distance of about thirty miles, and to make many other improvements in its lines. It is estimated that about $2,000 will be expended on the work. S. H. Fields, Whitesburg, is manager of the company.

HOWELL, MICH.—The Mutual Telephone Company, which has already built over three hundred miles of new line, expects to still further enlarge its system.

ST. LOUIS, MICH.—The Union Telephone Company's plans for improvement include the entire rebuilding of its system in St. Louis. It will have a complete cable system installed when the work has been finished.

COBDEN, MINN.—A number of new lines are to be built by the Cobden Mutual Telephone Company, and its plant made thoroughly modern in every particular.

MONTEVIDEO, MINN.—A new line between Watson and Montevideo is soon to be constructed by the Citizens' Telephone Company.

VIRGINIA, MINN.—The Mesaba Telephone Company is planning to erect a new line between Mesaba and Virginia.

MARSHALL, MO.—Plans for many improvements in its service at Marshall are being considered by the Saline County Telephone Company.

ST. LOUIS, MO.—Many extensions and improvements in its system are to be made by the Kinloch Long Distance Telephone Company.

LINCOLN, NEB.—Among the extensions in its plant being made by the Western Telephone Company are lines from Fairmont to Hebron, Lincoln to Falls City and other places. A new system is also being installed at University Place.

IDAHO, O.—Connections between Idaho and Latham are soon to be established by the Home Telephone Company, which is erecting a line between these two points.

KNOXVILLE, O.—A new rural line is to be constructed very shortly by the Knoxville Telephone Company.

NEWARK, O.—To take care of its increased business a new switchboard has been installed by the Newark Telephone Company, and plans for other improvements are being discussed.

BRITTON, S. D.—The plant of the Dakota Central Telephone Company at this city is to be entirely rebuilt.

MANILA, S. D.—A line from Manila to Wall is being constructed by the Great Western Telephone Company, whose intention it is to extend it on to the Black Hills.

DEL RIO, TEXAS.—A new long distance line from Del Rio to Uvalde, Bracket and Eagle Pass is among the extensions planned by the Del Rio and Western Telephone Company.

CHENEY, WASH.—A thoroughly up-to-date telephone system has been installed at this city by W. T. DuBois.

CALEDONIA, WIS.—Work on the construction of its system has been commenced by the Caledonia Farmers' Telephone Company.

DELEVAN, WIS.—Many improvements in its exchange at this place are being made by the Walworth County Telephone Company.

ELROY, WIS.—The Elroy Telephone Company is stringing new cables from its central exchange to the southern edge of Elroy, taking in the entire southern district wires and the Georgetown interurban lines.

MONDOVI, WIS.—Several new farmers' lines are to be erected by the Mondovi Telephone Company.

OCONTO, WIS.—Plans are under way by the Farmers' and Merchants' Telephone Company for the construction of a number of new rural lines.

PANSY, WIS.—It is the intention of the Badger Mutual Telephone Company to erect a new line from Pansy to Loon Creek.

PRAIRIE FARM, WIS.—Among the extensions recently made by the Barron County Telephone Company is a line to Prairie Farm, and the company is now planning for further extensions in its system.

SARONA, WIS.—Work has been commenced by the Sarona Telephone Company on its rural lines.

SPOONER, WIS.—Plans are being discussed by the Spooner-Evergreen Valley Telephone Company for the extension of its lines.

UNDERGROUND.

WILKES-BARRE, PA.—Considerable conduit work is to be done by the Pennsylvania Telephone Company in this city.

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The American Telephone Journal

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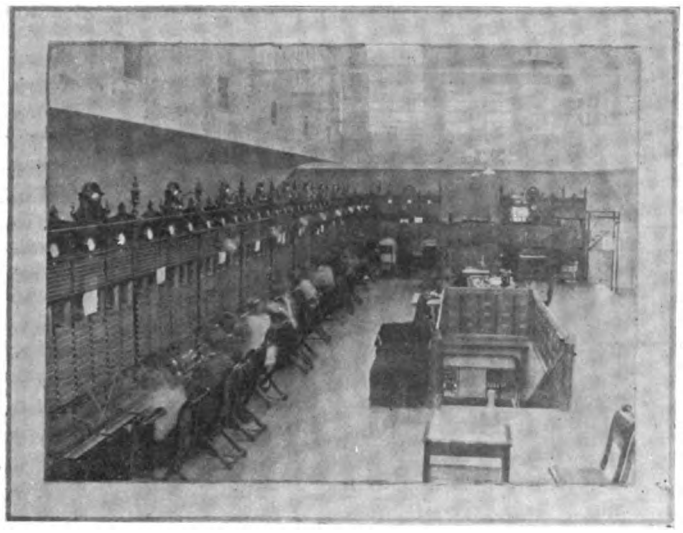
VOLUME XVI. SATURDAY, NOVEMBER 9. NUMBER 19.

A New Co-operative Telephone Exchange in the Capital of Finland*

By Georg Bergh.

STUDY of all the persons engaged in planning the telephone exchange in Helsingfors was concentrated on the task of making the operating room, in its arrangement and equipment, represent the highest standard obtainable. It was realized that, as in the case of a great deal of other equipment in this telephone exchange building, the achievement of satisfactory results in the handling of the apparatus was dependent in no small degree upon the amount of natural lighting admitted to the room. To introduce this light in the most appropriate manner it was considered desirable in the first place to locate the operating room on the top, or fifth, floor of the building. This made it possible to place windows extending in a complete row around all four sides of the building just below the roof, far above the level of the top of the switchboard, and thus allow the direct sunlight to fall naturally upon the switchboard jacks. In order to keep the entire room bright during the day, skylights are installed, giving an ample amount of glass in the roof. For the general illumination of the operating room during the evenings, reliance is placed upon a row of suspended electric lamps extending down the middle of the operating room. The face of the switchboard is lighted by lamps held in ornamental fixtures, projecting from the upper part of the board, between alternate pairs of operators' positions.

The ventilation and heating of the operating room received an amount of attention equal to that bestowed upon the lighting arrangement. A plant in the basement in connection with carefully arranged outlets provides for an ample circulation of fresh air maintained at a proper temperature for comfortable working.



A Partial View of the Operating Room in the Helsingfors Telephone Exchange.

The switchboards at the present time are of the magneto type, as it was not thought advisable to install common battery boards when the building was erected, on account of the considerable number of subscribers still reached by aerial lines. The replacing of the greater part of the open wire distribution by underground cable, which is at present going on, will put the entire plant in proper condition for the installation of a complete common battery switchboard. The switchboards now installed in the operating room have an ultimate capacity of 8,400 lines. There are 6,500 lines installed at the present time.

*Concluded from the issues of October 19 and November 2.

The location of the desk of the chief operator, who exercises supervision over the entire force in the operating room, is apparent from the accompanying illustration. Being centrally placed it enables a comprehensive view to be obtained of the entire room, so that the staff is constantly under the observation of the chief, who is able to promptly detect any laxity in handling connections. The service given is of a high grade and seems to be satisfactory to the patrons of the exchange.

To one side of the operating room on the fifth floor is a repair shop, and a room for the wire chief. Other rooms are set off for the office of the chief operator, and a retiring or bed room, to be used in case an operator is suddenly taken ill. The office of the chief operator, or superintendent, is equipped with a desk and signals for the observation of service, in accordance with standard methods. Here periodical tests are made to determine the grade of work being done by different operators on the staff. Observations are taken with the object of showing weak points upon which special stress must be laid in general instructions. Such records as are necessary in handling complaints and other communications with subscribers are available, and experience has shown some advantages in having the person who represents the highest direct authority in matters affecting the operating room located in a separate office. Of course all minor matters are handled by the chief operator at the desk in the operating room, and thrown to the private office only in case of necessity.

In conducting the exchange a system of reference between departments is in vogue, which enables the staff to report, test and clear all troubles on the lines very promptly. In this way no line need remain long out of service, and the prompt co-operation of the several departments of the company is a material aid to the furnishing to subscribers of the class of service which they expect.

Since the new exchange has been in operation the complaints of high charges which were formerly made with such frequency have wholly ceased to appear. The people of the city believe that they are receiving an adequate service, and as each one has a personal interest in the system, and takes pride in its efficiency, the effect is to stimulate the employees to put forth their best efforts.

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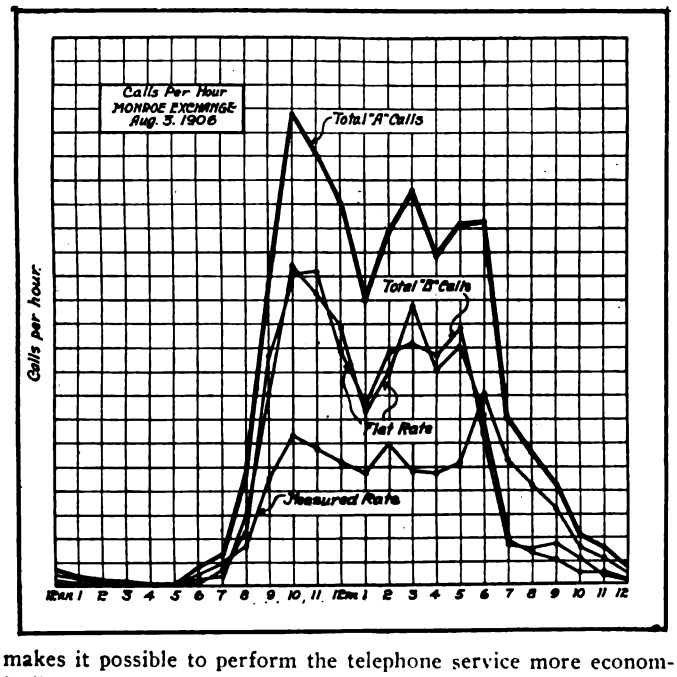
Determining Rates for Large Telephone Exchanges*

By W. H. Crumb.

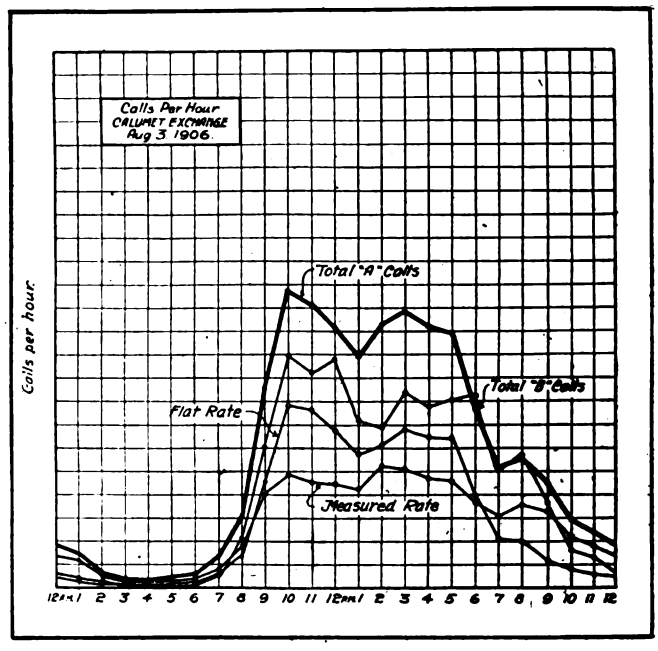
GREAT variations in the hourly use of the telephone increase in a marked degree the cost per message for operating, because the telephone company must always have enough operators on hand to meet the requirements of the hour, and must have a sufficiently large switchboard to enable it to handle all the calls which arrive at the busiest hour. Even with the best arranged schedule for the operators' work, it is impracticable to arrange for operators to be on hand for only one or two hours in the morning and one or two hours in the afternoon, but the operators must be put at work for a considerable number of hours at a time, so that the irregularities of the load curves which run up into high peaks increase the cost of operating on account of increasing the average number of operators that must be kept on duty in proportion to the total number of calls per day. They also increase the cost for interest and maintenance on account of the extra switchboard positions required to enable these extra operators to perform their work.

A scrutiny of the load curves of the various exchange offices and especially of the business offices, indicates that the greatest proportion of the peak of the load in each exchange office comes from the flat rate users, and that the measured rate curve is more uniform over the period of the day. This absence of peak


Calls Per Hour
MONROE EXCHANGE
Aug. 3. 1906
Total "A" Calls
Total "B" Calls
Flat Rate
Measured Rate
Calls per hour.
12 Mid. 1 2 3 4 5 6 7 8 9 10 11 12 Noon 1 2 3 4 5 6 7 8 9 10 11 12

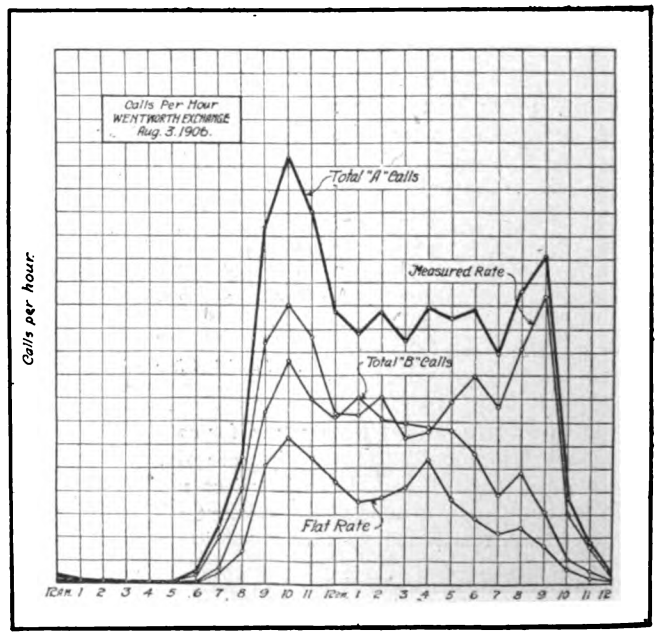
makes it possible to perform the telephone service more economically, and the present measured rate users are therefore less expensive users to whom to supply service. A measure of the expense of operating is to some degree indicated by the ratio of the maximum number of calls in the busy hour to the total number of calls per day in the exchange. This ratio is larger for the flat rate calls than for the measured rate calls in the Chicago exchange district. As shown by the twelve "peg counts" for 1906, the average ratio for the total number of originating calls is .1072, the ratio for the flat rate calls is .1185, and the ratio for all measured rate calls, including ten-party lines, is .0991, which indicates that the cost of operating for the measured rate calls is less than the cost of operating for the flat rate calls. Other peg counts show similar results.

Service inspection tests from the New York City exchanges, which are operated almost entirely on the measured service basis, show that the proportion of unavailing calls there is only about one-sixth of the total calls, and that the proportion of calls receiving busy reports is one-twelfth of the total calls. A comparison of peg counts for these two exchange systems indicates that the expense for traffic employees per station is lower in New York than in Chicago, and the conclusion therefore is that this difference must be due to the measured rate method of charging for service.


Calls Per Hour
CALUMET EXCHANGE
Aug 3 1906.
Total "A" Calls
Total "B" Calls
Flat Rate
Measured Rate
Calls per hour.
12 Mid. 1 2 3 4 5 6 7 8 9 10 11 12 Noon 1 2 3 4 5 6 7 8 9 10 11 12

Study of the load curves indicates farther that the way in which the calls become distributed in the system makes it possible for the telephone company to arrange its operating force more economically to take care of its present measured rate service, and therefore actually enables the telephone company to make the cost of operating less per individual call of the measured rate service than it can for the flat rate service.

On the flat rate basis the telephone subscriber who makes calls over his telephone line twenty or more times per day (perhaps even fifty or one hundred or more times) pays the same


Calls Per Hour
WENTWORTH EXCHANGE
Aug. 3. 1906.
Total "A" Calls
Measured Rate
Total "B" Calls
Flat Rate
Calls per hour.
12 Mid. 1 2 3 4 5 6 7 8 9 10 11 12 Noon 1 2 3 4 5 6 7 8 9 10 11 12

price as the subscriber who uses his telephone only eight or ten times a day, and the flat rate being an average rate which enables the telephone company to come out at the end of the year with its expenses all paid and a balance to pay interest on

*Abstract from a paper read at a meeting of the Western Society of Engineers, Chicago, concluded.

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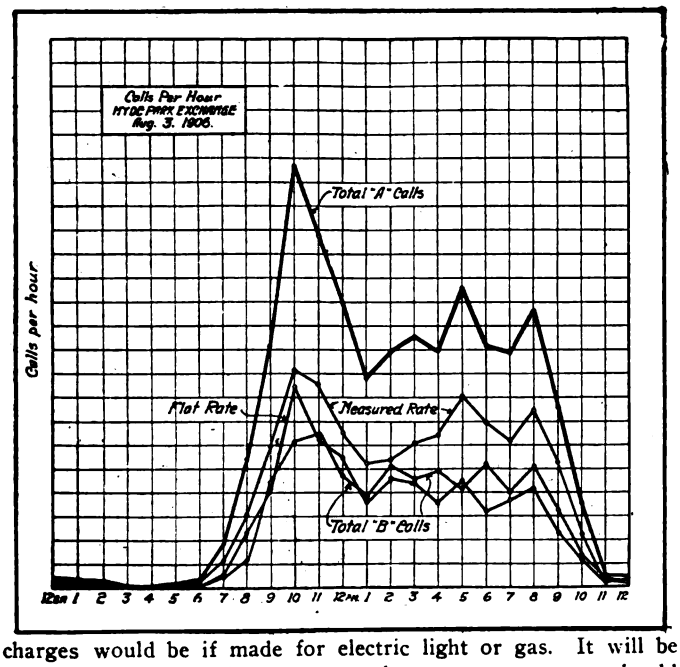
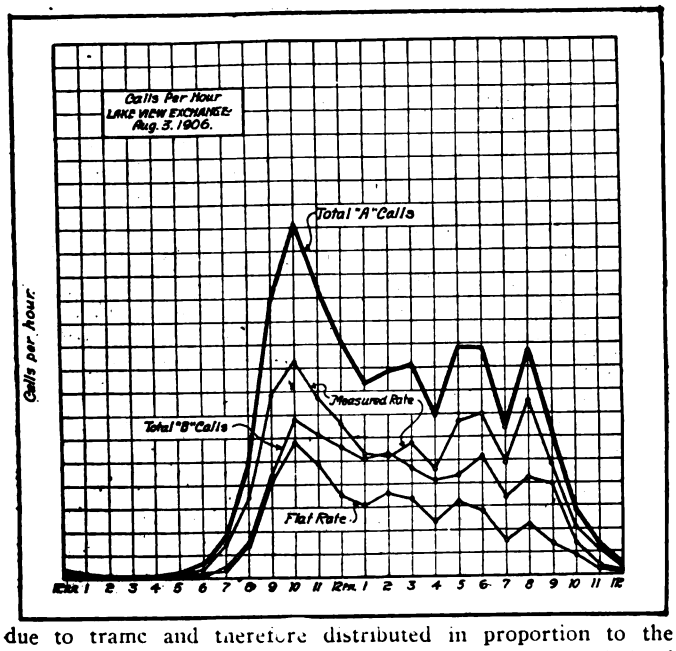
its investment, it is obvious that the small user pays more for his telephone than his use makes necessary and the largest user pays less for his telephone than his service probably costs the operating company. This is so manifestly unfair that there can be no justification in maintaining a strictly flat rate telephone charge in large cities with the present known methods of operating. Such charges for telephone service are as unjust as similar


Calls Per Hour
HYDE PARK EXCHANGE
Aug. 3. 1906.
Total "A" Calls
Flat Rate
Measured Rate
Total "B" Calls
Calls per hour
12Mn 1 2 3 4 5 6 7 8 9 10 11 12M 1 2 3 4 5 6 7 8 9 10 11 12

charges would be if made for electric light or gas. It will be recognized as absurd to suggest that a gas company should charge a fixed rate per year for each gas burner in a place of business, regardless of the number of hours that the place of business is open.

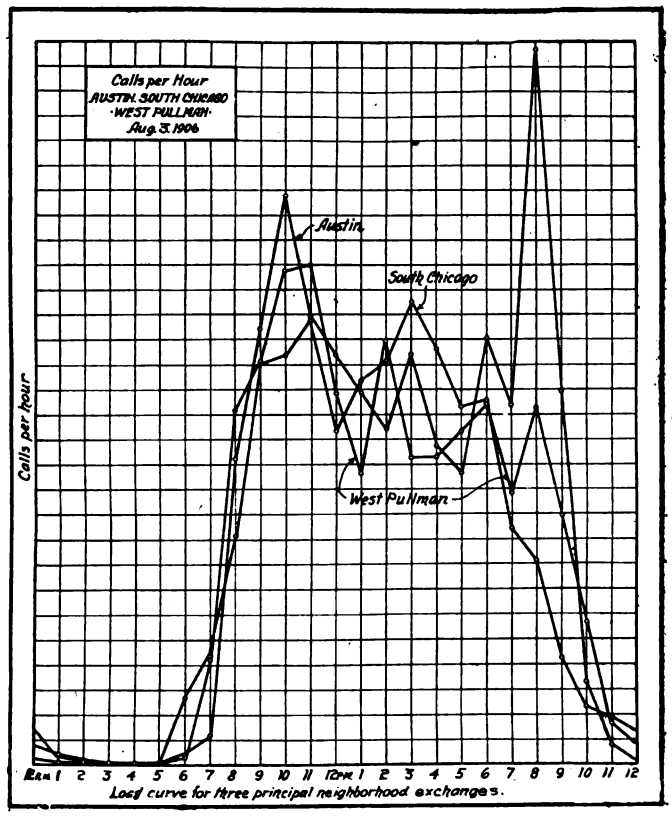
From the foregoing it will be seen that in the interest of good service, economy of production and uniform justice in charging for the different classes of service, the measured service plan is much to be preferred to the flat rate method.

A very little consideration of the expense of maintaining a telephone plant leads one to the conclusion that maintenance expenses are very largely directly due to traffic, and all maintenance expenses must be considered as being directly or indirectly


Calls Per Hour
LAKE VIEW EXCHANGE
Aug. 3. 1906.
Total "A" Calls
Measured Rate
Total "B" Calls
Flat Rate
Calls per hour
12Mn 1 2 3 4 5 6 7 8 9 10 11 12M 1 2 3 4 5 6 7 8 9 10 11 12

due to traffic and therefore distributed in proportion to the traffic. The same may be said of general expenses and fixed charges.

Depreciation of the plant is an item of expense in producing telephone service which is often neglected or underestimated in the consideration of the fixing of telephone rates. Much of the depreciation on a telephone plant is directly caused by the traffic. This is especially true of the depreciation of equipment—both central office and subscribers' stations; also depreciation due to the advancement of the art, as traffic often demands that present equipment and methods be replaced by more modern ones before the ones in use have been worn out. The depreciation on parts of the plant which cannot be directly traceable as a result of traffic is indirectly due to it, as the object of the plant is to provide for traffic and therefore depreciation charges should be classified in proportion to the traffic. Taken in conjunction with the depreciation there should be set aside a fund to cover insur-


Calls per Hour
AUSTIN. SOUTH CHICAGO
WEST PULLMAN
Aug. 3. 1906
Austin
South Chicago
West Pullman
Calls per hour
12Mn 1 2 3 4 5 6 7 8 9 10 11 12M 1 2 3 4 5 6 7 8 9 10 11 12
Load curve for three principal neighborhood exchanges.

ance on those portions of the plant which the fire insurance companies will not underwrite at reasonable rates. An amount proportional to the value of the plant should be put into the fund each year, and the amount must be computed from experience as to the average life of the different parts of the plant, making due allowance for the "scrap" value of discarded apparatus, judgment of the rate at which street, bridge and park improvements are likely to be made which will interfere with the company's plant, and experience of the fire hazard.

The computations of the Special Telephone Commission are shown in the following table:

Property.	Life in Years.	Per Cent. to Depreciation Account.	Per Cent. Salvage.	Per Cent. to Reconstruction and Insurance Account.
Underground conduit, main, clay in concrete	50	.89	0	1½
Underground conduit, main, fibre, etc.	20	3.72	0	
Underground conduit, subsidiary	20	3,72	0	2
Underground cable, main	20	3.72	40	2
Underground cable, subsidiary	15	5.38		2
Aerial cable	15	5.38		3
Poles, including cross-arms, etc.	10	8.73	0	4½
Aerial strand	12	7.05	0	3½
Aerial cable terminals	12	7.05	0	3
Aerial wire, copper	15	5.38	70	3
Drop wires, copper	8	11.25	15	4
Subscribers' station instruments	10	8.73	5	2
Private Branch Exchange switchboards	8	11.25	20	2
Central Office switchboards	8	11.25	20	2
Buildings, fireproof	40	1.33	0	1
Teams, tools, furniture, etc.	4	23,92	10	0

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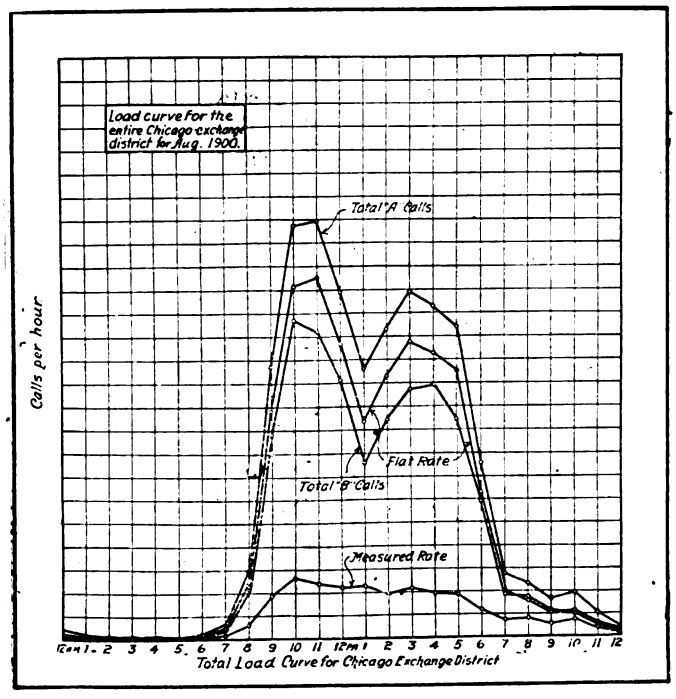
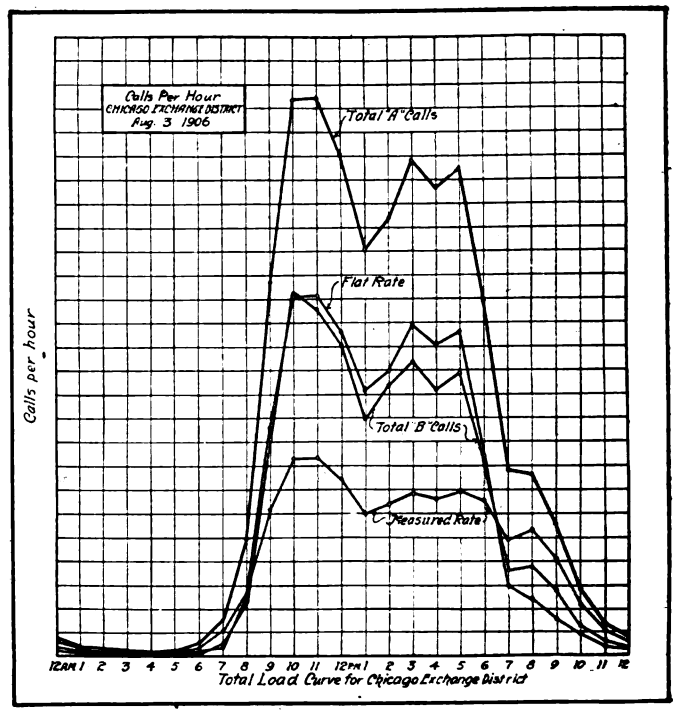
In order to determine the proper rate to charge the cost must first be ascertained for each class of service offered, and to do this means a careful investigation and determination of all of the above questions. It means particularly that telephone companies must pay more attention to the results of their peg counts in such a way that they will furnish them the information necessary for the accurate fixing of rates. This complex problem offers many interesting opportunities to the telephone engineer, and it is to be hoped that the great telephone companies of our large cities will soon set about a means of determining the exact cost of the different classes of telephone service, so that it may be furnished without discrimination in charges to any class of users, and so that the small user may be able to provide himself with telephone facilities at the lowest possible cost consistent with good business practice. Not until our great telephone companies can truthfully say from their own knowledge that they do this can they claim to be discharging the duty assumed upon entering the telephone business.


Load curve for the entire Chicago exchange district for Aug. 1900.
Total 'A' Calls
Flat Rate
Total 'B' Calls
Measured Rate
Calls per hour
12AM 1 2 3 4 5 6 7 8 9 10 11 12PM 1 2 3 4 5 6 7 8 9 10 11 12
Total Load Curve for Chicago Exchange District


Calls Per Hour CHICAGO EXCHANGE DISTRICT Aug. 3 1906
Total 'A' Calls
Flat Rate
Total 'B' Calls
Measured Rate
Calls per hour
12AM 1 2 3 4 5 6 7 8 9 10 11 12PM 1 2 3 4 5 6 7 8 9 10 11 12
Total Load Curve for Chicago Exchange District

Magneto Lamp Signal Telephone Switchboards*

By G. A. Joy.

IT is not always necessary to use a double wound relay in the line circuit. In Fig. 4 is shown a circuit which requires a relay with but one winding to do the same work as the double wound relay in Fig. 3. The operation of this relay is as follows: The alternating current from the hand generator in the telephone set comes in over the tip side of the line, passes through the tip contact in the jack to ground, and from ground through the lamp and the relay winding to the sleeve side of the line through the sleeve contact in the jack. This causes armatures *a* and *b* to be attracted, and as soon as these are once pulled up a circuit can be traced from ground through armature *a* to the sleeve side of the line through the jack, the relay winding and the contact on armature *b* to battery. Thus a closed circuit is formed which can be broken only by the operator inserting the plug into the jack, which act opens the tip and sleeve contacts. At first glance it would seem that the generator current having to pass through the lamp would be likely to injure it, but it must be noted that the generator current passes through this path only long enough to cause the armatures *a* and *b* to draw up, which is only the fractional part of a second. When armature *a* is drawn up it will be observed that the sleeve side of the line is grounded, and since the tip side is normally grounded the generator current is shunted around the relay and lamp.

The scheme indicated in Fig. 4 is by far the most interesting of the four described, and, consequently, in Fig. 5 is shown a circuit of a complete connection employing this method. To best illustrate the operation a connection should be traced from station *A* to station *B*. When a person at station *A* desires a connection he gives the generator crank a turn, causing current to flow over the line and through the winding of the line relay *a*, causing it to draw up its armatures and lock on itself, as explained in the description of Fig. 4. The operator, upon seeing the lamp, inserts the answering plug of a pair of cords into the jack, thus breaking the battery circuit through the relay and allowing the armatures to fall back, thus causing the lamp to be extinguished. The operator now operates the listening key and upon learning that a connection is desired with a party located at station *B*, she inserts the calling plug into the jack of that line, and operates her ringing key. When the parties have completed their conversation they "ring off" operating the supervisory relays, which in turn cause the supervisory lamps to light.

At this point it might be well to describe the operation of the supervisory relay in detail. When the party at station *A* rings off current is sent out over the tip of the line through the jack, the tip of the plug, the closed contact in the key, the sleeve of the plug, the jack, the sleeve side of the line, and back to the generator in the telephone set. This generator current causes the relay to draw up its armatures *e*, *f* and *g*. When this is once done, a battery current may be traced from the third conductor of the jack to the plug through the closed contact on armature *e*, the winding of the relay, armature *f*, and closed contact on this relay to closed contact on listening key to battery. This battery circuit will cause the armatures to remain drawn up until the operator breaks the circuit by withdrawing the plug from the jack, or operating her listening key. The reason for having this circuit completed through the contacts in the listening key is, that should only one party ring off, the act of the operator listening in to see what is wanted

*Concluded from the issue of November 2.

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will extinguish the lamp and thus prevent the unnecessary waste of battery current.

The circuit in Fig. 5 shows double supervision. While this is not absolutely essential it has a number of advantages over the single supervision. To adapt this scheme to a cord circuit for single supervision, the condensers and one relay with its associated lamp will not be required. Otherwise the circuit will be as shown in Fig. 5.

The adaptability of this type of equipment in the ordinary magneto exchange is a problem that should be easily solved by exchange managers. In many ways lamp signals appeal to the telephone man. The lamp lights up without any apparent cause, which, in a way, fascinates him, and he thinks that this will be a good type of board for him to have without further investigation. But the shrewd business manager looks deeper than just the mere surface. He investigates the first cost as compared with that of the drop board, the maintenance expense, the trouble the board is apt to cause, and finally the adaptability of the lamp equipment for his particular conditions. In regard to the first expense—one acquainted with telephone apparatus can easily see that the cost of the lamp board will far exceed that of the ordinary drop board; and in addition to the board itself it is necessary to provide a set of storage batteries and some means for charging them, also. The item of maintenance is also one that is of great importance. In the drop board, the principal expense is the repairing and replacing of cords and the renewal of the transmitter batteries, while in the lamp signal board, in

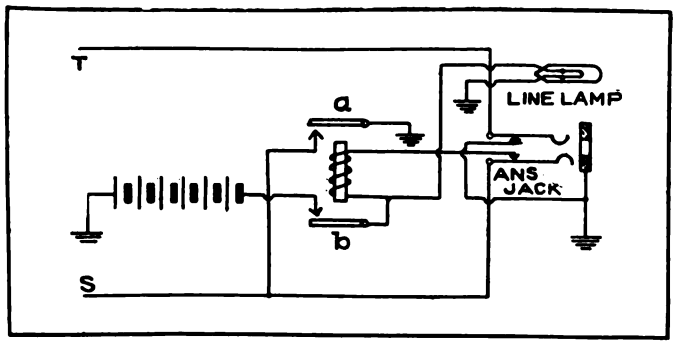

Fig. 4. Line circuit for lamp signal magneto board, with lamp controlled by one single-wound relay.

addition to this, is the expense of lamp renewals and the daily expense for power necessary to keep the storage batteries properly charged. The amount of trouble on a lamp board as compared to a drop board should be apparent to the reader from the complication in the lamp circuits as compared to the drop circuits. The telephone trouble man that is not familiar with relay boards of some type has a hard proposition on his hands in the care of a magneto lamp signal board, as the circuits are even more complicated than on most small common battery boards.

For straight magneto equipments there is nothing superior to the drop boards, for the first cost and the maintenance are decidedly less than for lamp equipped boards. The writer knows of instances in which telephone companies have had lamp equipments installed and after a trial of a year or a little longer, have replaced it with the drop boards. One of the principal reasons for this is that a telephone company in a small town cannot afford to pay the salary of a man capable of properly handling this type of equipment.

There are places where it might be advisable to install lamp signal boards. For instance, when it is the intention to change over to a common battery system, then all that is necessary is to change the wiring, as all this apparatus is equally as well adapted to a common battery as to a magneto board. For multiple toll boards the lamp signals are especially well fitted, as in this case the saving of space is an essential feature. The circuit for such a toll board differs necessarily from the ones shown, but employs the same general scheme.

INCREASE OF BRANCH EXCHANGE RATES STIRS UP CONTROVERSY IN NEW ORLEANS.

LEADING business men in the city of New Orleans are up in arms against the Cumberland Telephone & Telegraph Company on account of what they claim to be an arbitrary, unwarranted and unreasonable raising of rates for branch exchange service. They claim that diligent efforts have been made to induce them to take this class of service, and that claims were made that it would be to their advantage, both in the way of improving the service and the diminution of cost. The rates are now being raised, and business men think that the Bell company set forth its arguments to hoodwink them into taking this class of service, with a view of later raising its rates to draw from them excessive profits. The Cumberland company claims that the new rates are based upon sound business principles, and are necessary to enable it to pay expenses and earn reasonable profits on its investments. Numerous meetings have been held, and it is probable that a definite investigation of the company's service will be held. Mr. Edward Rightor, chairman of the Progressive Union, at a recent meeting of that organization, offered the following motion, which was adopted:

"That the secretary of the Progressive Union communicate with the mayors and boards of trade of all the larger cities of the country as to the number of the telephones in operation, the cost of direct business telephones, the cost of residence telephones, party lines and private exchanges; as to whether there are one or more companies in the field, the area of service covered, the population in the aforesaid area, the character of service rendered and other matters of interest in the present controversy."

Mr. M. B. Trezevant, secretary of the Progressive Union, has also addressed to the district superintendent of the telephone company a request for information as to the nature of the plant and the amount of income corresponding to the different classes of service offered by the Cumberland Company in New Orleans, in order to furnish a basis for comparison with statistics obtained from other cities.

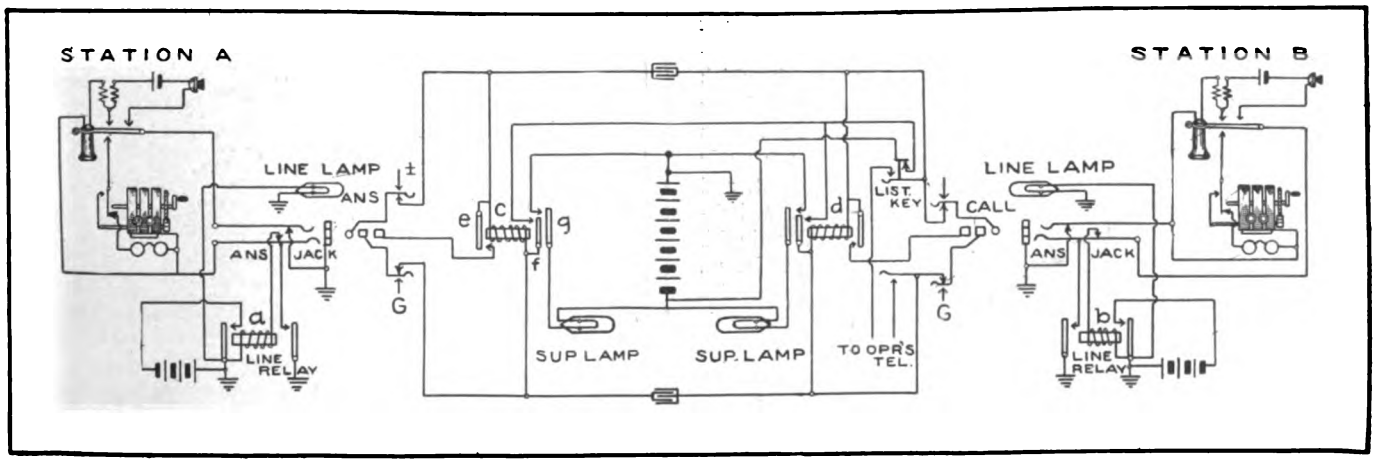

Fig. 5. Complete connection through magneto board, using same line circuit as shown in Fig. 4 and supervisory lamps in cord circuit.

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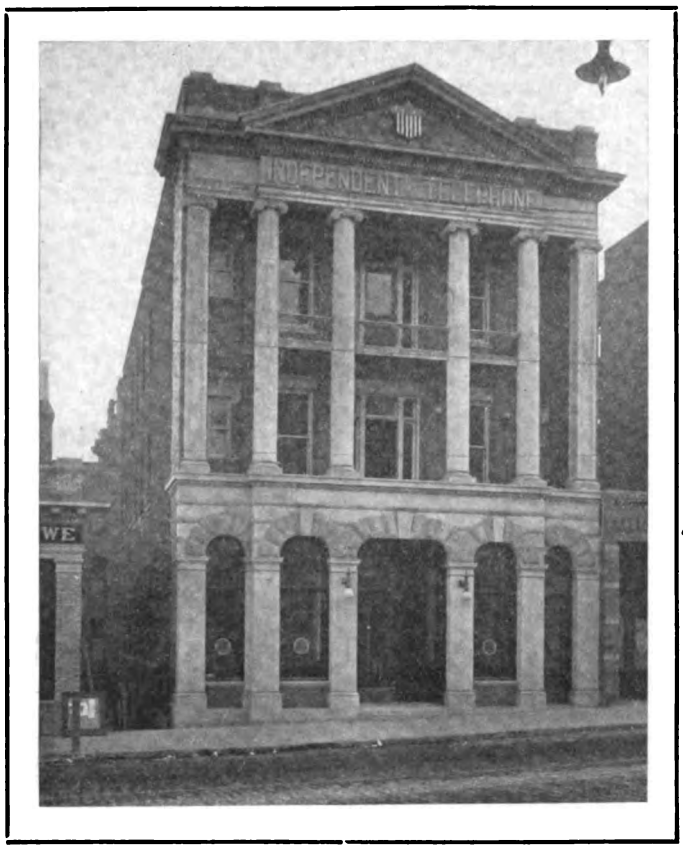
The New Independent Exchange at Butte

By C. L. Maxim.

With two thousand telephones reported in operation, and orders booked for a thousand more which will soon be installed, the opening of the first exchange of the Montana Independent Telephone Company, at Butte, has been an auspicious one. General offices of the company and its exchange equipment, which represents the highest development of the automatic type of apparatus, are located in a fire proof building of substantial construction and imposing design on one of the best sites in the city. In the laying out, fitting and finishing of the general offices every arrangement which would facilitate the prompt and business-like transaction of its affairs is provided by the company and the officers have not lost sight of the desirability of making a pleasing impression upon visitors by means of the attractive appearance of the interior of the building.



New Headquarters and Exchange Building of the Montana Independent Telephone Company at Butte.

Equipment is provided for giving to a large list of subscribers telephone service of the most prompt and reliable character. The central office apparatus, located on the third floor, is not only arranged with a view to present efficiency, but also to providing adequately and economically for the large growth which it is expected the future addition of new business will bring to this exchange. Switchboard and main distributing frames have already been installed for 3,500 lines, and plans are made for an ultimate capacity of ten thousand. This equipment, and the generating and ringing machines, with the power switchboard are located on the third floor, which they will ultimately fill.

The main distributing frame is of the F. B. Cook type No. 10, mounted 100 pairs upright on the switchboard side, and 125 pairs on the line terminal side. The rack is so installed as to permit of additions at each end as the exchange increases, the party line uprights increasing to the left, and the straight lines at the right of the rack. The switchboard proper comprises both the straight line and party line equipment, as a preliminary canvass of the business developed a strong demand for party line service.

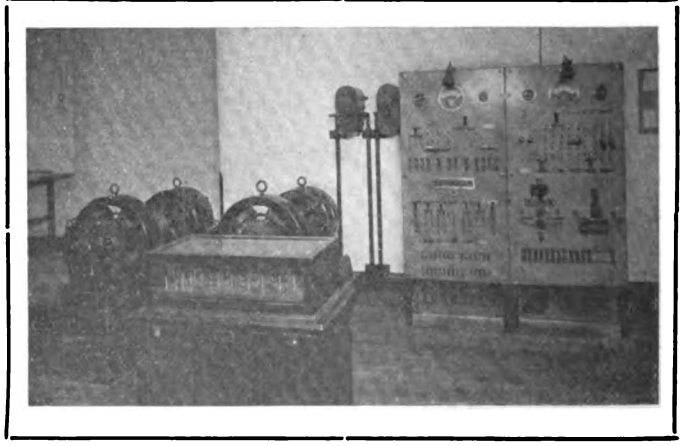
The straight line equipment is the latest type automatic line switch, which has been installed and operated with success in various exchanges for the past year and a half. Each board or section is made up of 100 line switches, for which are provided ten outgoing trunks, from which all calls outgoing are made. For incoming calls to each board, ten connecting switches, having control over the entire 100 lines, are provided. Between the line switch and the connecting switch is located the trunking section, where the selection of numbers is made in the manner common to all automatic exchanges.

The party line equipment, which allows two, three or four parties to be connected on one line and called individually, makes use of the harmonic ringing principle. While ringing on party lines is non-interfering and selective, it does not necessitate the use of a lock-out device. Trunks between the party and straight line switches with an increase over the standard ten per cent. equipment in four of the party line boards takes care of all calls between party line and straight line switches.

The harmonic convertor, or ringing machine, which provides ringing current for the entire exchange, and which is installed in duplicate, furnishes current of four cycles, namely 16, 33, 50 and 66, of which the 33 cycle current is used for the straight line telephones, and the 16 cycle for long distance lines. The harmonic ringing device is also equipped with a busy signal, for notifying calling subscriber when line called is busy. This portion of the equipment is also furnished by the Automatic Electric Company of Chicago.

The power plant proper consists of a two-panel, pink Tennessee marble power board, fitted with Crouse-Hinds switches and Weston instruments, duplicate sets of Gould storage battery 320 ampere hour cells, 25 cells to each set, with room in each tank for an addition of 640 ampere hours capacity; there are two charging sets, each consisting of a ten-horse power Allis-Chalmers three-phase induction motor, connected direct to a Holtzer-Cabot 75-volt, 80-ampere generator. The power plant throughout is in duplicate, and of sufficient capacity to operate in connection with an exchange of 10,000 lines. It may be added to from time to time in accordance with the growth of the exchange.

The toll board, information desk, and wire chief's desk are finished in mahogany. The toll board and information desk are installed on the first floor, in the rear of the general office. The signals are of the lamp type, with double supervision for cord circuits. The toll board is also provided with ten circuits for pay stations, which are operated as manual telephones under direct supervision of the operator. The wire chief's desk, which is located in the switchboard room, is of the two position type, one position being used for the trouble clerk. This position is in multiple with the information desk, on the first floor, so that both desks can be taken care of by one clerk at night. The wire



The Power Plant in the Butte Independent Exchange.

(Concluded on page 311.)

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Practical Questions and Answers

MAGNETIC LAG.—(937.)

The writer has heard a technical man frequently speak of the magnetic lag in an induction coil. Will you kindly advise what is meant by this term "magnetic lag" and how it affects the action of the induction coil? An early reply to this will be greatly appreciated. M. A. D.

MAGNETIC lag will be found not only in induction coils, but in all coils built on the electromagnetic principle. Whenever current is impressed upon a conductor, around which lines of magnetic force are formed, the magnetism occurs somewhat slower than the current travels. Consequently as it takes it up slower there is a slight lag in giving it off; for this reason the magnet still has some power left after the source of current has been removed. This it gives off in the form of a back kick, or a discharge in the opposite direction. This factor is utilized in impedance or choke coils.

Magnetic lag is sometimes called by the names of impedance or retardation. The action which takes place is exemplified in the analogy of a wagon which is pushed by a spring attached to the rear. By exerting a pressure against this spring it takes a little longer to start the vehicle, as it is necessary to first overcome the strength of the spring; however, after you have once started the wagon in motion you will not notice the spring being there; but when you stop, and release the pressure against the spring, it will expand, and cause a force in the opposite direction, which is the force that you generated, and which was absorbed by the spring when you started to push the wagon. In this the wagon represents the work being done, the spring the magnetic lag and your strength the electromotive force.

WHEATSTONE BRIDGE.—(938.)

Will you kindly describe in a simple manner the principle of the Wheatstone Bridge and how it is used in measuring resistance of telephone lines, etc. A. L. O., New York.

THE Wheatstone Bridge is employed for the measurement of resistance, and consists of a kite-shaped arrangement of resistances in which each arm of the kite or bridge is a different resistance.

In the bridge there are two resistances in multiple connected across by a galvanometer or some instrument of equivalent delicacy which indicates the existence of certain conditions. These conditions can only exist when the resistances bear a certain numerical relationship to each other. The relationship is simple, and can be expressed by the conventional formula $A:B$ as $C:D$, when A, B, C and D represent the four resistances obtained by connecting across the loop by a galvanometer, as shown in Fig. 938*a*.

The real meaning of this remarkable relationship is, that when the ratio of A to B is the same as C to D no current passes

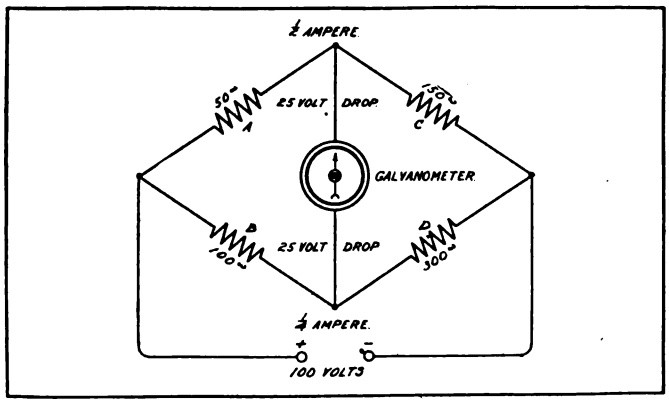

Fig. 938a.

through the galvanometer circuit and the bridge is said to be balanced.

In the practical application of the Wheatstone Bridge for the measurement of resistance the three arms, as they are called, A, B and C, are utilized as follows: A and B are adjusted to a fixed ratio, such as 1:2, 1:10, or 10:1000, etc., C is then manipulated until a balance is struck; that is, until the galvanometer is at rest. The conditions that then exist are that the arms express the ratio of $A:B::C:D$. In such a case as this D is the resistance to be found, and it can only be ascertained by balancing the bridge. To balance the bridge the unknown resistance is inserted in that part representing the D arm, and when the correct ratio is established the process is completed.

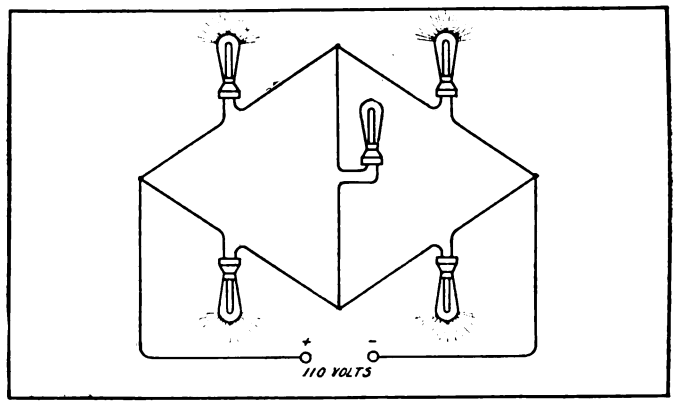

Fig. 938b.

A very simple experiment may be made which readily illustrates the principle of the Wheatstone Bridge by connecting incandescent lamps, as shown in Fig. 938*b*, and noting the fact that when the lamps in the four arms are burning the middle lamp will not burn.

The entire principle and operation can be summed up very concisely in that the drop must be equal in the A and B arms that the galvanometer be at rest, and in order that this condition may obtain, the resistance of the different arms must express the ratio before given.

EXPLANATION OF REACTANCES.—(939.)

We have recently had explained to us that there are three reactions set up in a circuit in which an alternating current is flowing, namely: capacity reaction, inductance reaction and resistance reaction. Kindly explain to us through the medium of your valuable paper the difference between these ractions and how each one affects the circuit the alternating current traverses. P. D. S.

AS reaction means the same thing in the three cases we will first consider the meaning of that term. Reaction is the power of resisting or the tendency to force in the opposite direction.

It is understood that circuits of all kinds and conductors of all kinds are capable of storing a certain amount of electrical energy. This property of conductors is termed capacity. The action of a conductor having this property of capacity on an alternating current is to absorb a certain portion of it as the electromotive force increases and to give it back as the force decreases. In other words, when the electromotive force is building up it is raising the potential in the capacity of the line. When it has reached its maximum and as the electromotive force is on its downward path the line discharges the current stored in the opposite direction to the electromotive force.

An electric current flowing through a conductor sets up a field of force about the conductor covering its entire length. This field of force consists of magnetic lines extending in closed curves about the conductor. These lines of force are going in a direction at right angles to the flow of current in the conductor. If two wires are run side by side as a pair of telephone wires and the current is flowing in opposite directions in each, then it will be seen that the magnetic lines of force are opposing each other. If one line has current on it and the other has not then the live wire will set up an induced current in the other thus causing cross talk or induction.

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Editorial Comments

WHAT ABOUT WRITTEN EXAMINATIONS FOR TELEPHONE MEN?

LONDON telephone installers and troublemen seem to be making a rather unusual fuss over an order which requires them to take a course of twelve weekly lectures, and then pass a written examination on the substance of the ground they have covered. As nearly as the drift of the objections raised to this course can be gathered from this distance, they seem to be based on the belief that while success in the examinations will bring no increase in pay, failure will be followed by dismissal. The men also claim that the examinations will be no test of competence, because their ability to do their work depends upon the knowledge and dexterity gained through years of experience, while new men, often with the highest theoretical qualifications, are absolutely useless until they have served an apprenticeship with old service men.

Apparently the London electricians are making the same mistake that is holding back some of the old-timers on this side of the water. The telephone business is one that has been and is developing so rapidly that the details are being constantly modified in themselves, and shifting their relationship with one another. Under these conditions a man who wants to hold his job should not speak too loudly of the value to his employers of the knowledge he has gained in years gone by. As a matter of fact, much of this knowledge goes in the same class with the apparatus it concerns—it belongs in the junk heap, and the space it occupies should be free for the reception of new material.

The co-operation of telephone men in movements for mutual advancement in knowledge of the business, and improvements in individual efficiency, is one of the most significant outgrowths of the rapid development which the business has experienced during the past few years. In most sections of this country now the telephone companies are hampered more or less in providing for continued growth by the fact that even the men who have been longest in their employment are, in a sense, one-department men. Linemen have no knowledge of how books are kept, nor of the way specifications are made. Consequently they have little appreciation of the necessity for bookkeeping or specifications, and have not the interest in these matters which leads them to intelligent co-operation with the men who do the work on the books and other papers. This lack of all-round ability, as has been mentioned, hampers the company somewhat, but is a great deal more serious loss to, for example, the lineman. In time, if he is able, he may so perfect his skill along the special lines in which he is engaged that he can handle a considerable number of men, keep their time correctly, and get nearly every job done at a very reasonable figure. Naturally, when he reaches this point, both he and his superiors think that he is in a direct line for promotion and right here is where he goes up against the same kind of a test that is scaring the men over in London.

The lineman with no detailed knowledge of the work of clerks and operators, cannot be put in charge of an exchange as manager without question. He must prove that he is fit to be "boss." He must show that, within a reasonable time, he will acquire such a grasp of whatever new duties are likely to be placed upon his shoulders as will make him more familiar with the work of those who are made his new subordinates than they are themselves. In other words, the man who is going ahead must show that he is mentally alert and able to acquire and hold new information. As long as the need for telephone service remains in any community telephone companies will grow, organizations will change, and the men who show that they are able to do work will find opportunities enough.

It would seem to be a rather agreeable idea to a lineman to submit to such a test of fitness as that which has been suggested after twelve weeks of preparation, with a full knowledge of what the requirements are to be. Of course the Londoners are taking the matter over-seriously, but there is no doubt that nearly every man of the objectors has been in more than one test, failed, and been rejected, without ever knowing that he has been under examination. The present plan not only offers a means of obtaining useful knowledge of the work which is to be done, but has a more intimate personal value to some of the men, as a means of pointing out those weaknesses which must be corrected before progress is possible. While it gives the employer a line on the men who are ready to go ahead now, it may show some of the employees their need of taking a brace, in time to be ready for the first good thing that comes up, in a way that will do them material good.

ONE TEST OF A TRAVEL-SAVER.

DAILY travel of business men between residences and moderately distant cities seems to be considerably affected by the use of the telephone. An article in a recent issue of an Eastern newspaper attempts to show how much the telephone has thinned the ranks of the old-timers who used to assemble at the station for the early morning train to the state capital. In this case the length of the journey was something like two hours, and the loss of four hours a day was sufficient to finally overcome whatever conservatism prevented the use of the more speedy method of communication by a large number of men.

Prominent lawyers, local merchants, who made frequent trips to buy goods or supervise branch sales departments, and others found, as the value of their time increased, that the worth of hours lost on the train was greater than the gain in efficiency of their staffs due to personal supervision. The telephone service is sufficiently flexible to fulfill all requirements of necessary communication in nearly every case that comes up, either in matters of routine or emergency, and its use is enabling a great many people to transact necessary business in distant places without incurring the daily inconvience of railway travel.

RATE FIXING BY LEGISLATION AND OTHERWISE.

LOUISIANA has a case relating to the power of the railway commission to fix telephone rates in her Supreme Court. It got there on the complaint of a telephone company that the rates established by the commission were confiscatory. There are a great many telephone companies who believe that the rates under which they are operating are very nearly confiscatory, and many of them are trying to modify these rates by permission of the various legislative bodies, or what is even more difficult, by obtaining the direct sanction of their subscribers. In almost every case the particular difficulty raised by the opponents to the increase is that some company operating under what seems to be parallel conditions is giving good service, and apparently achieving financial success at the low rate. When this argument is sustained it puts up to the company rather strongly the question whether or not it is operating at a reasonable cost, in other words, whether it is manufacturing its product economically.

In nearly every business except that of furnishing telephone service the producers are able to agree on at least approximate standards of unit costs, and those engaged in the business are acquainted with these figures. The diversity of opinion on this matter amongst telephone engineers and managers is one of the things which is leading governing bodies in several states into action based on insufficient knowledge, and not infrequently a belief that they are the object of efforts at deception on the part of the telephone officials. It will be difficult to overcome the tendency toward this attitude without conveying more practical information than is furnished in many cases of official inquiry. Usually an unbiased investigating committee would be more impressed by proof that rates were reasonable, as compared with the cost of service figured on a basis they could understand, than by a more or less confused showing of inadequate profits, brought out during an examination of books containing charges which are not definitely explained.

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Telephone Law

CONDUCTED BY A. H. McMILLAN.

TAX SYSTEM OF DELAWARE.

Will you please explain to us what the system of taxing telephone companies is in Delaware? We understand it is a little different from that in vogue in most states. J. E. B.

ACCORDING to the revised Code of Delaware of 1852 as amended in 1893 (Chapter 128, Page 72) telephone companies are expected to pay 60c. per mile for their longest wire in the State, 30c. per mile for the next longest, and 20c. for every other wire. A statement must be made to the State Treasurer showing the whole number of miles of wire owned by the company in the State, together with other information. The estimate of the State Treasurer is final. For failure to pay taxes, personal property of the telephone company may be distrained and sold.

TO FORCE EQUAL PRIVILEGES FROM TELEPHONE COMPANIES.

AT Wytheville, Pa., the Ivanhoe Furnace Company has instituted a mandamus proceeding against the Virginia and Tennessee Telephone Company, to compel the company to give subscribers of the Wythe Mutual Telephone Company the same rights and privileges now enjoyed by subscribers of the Wytheville Telephone Company.

About six years ago the Virginia and Tennessee Telephone Company and the Wytheville Telephone Company entered into a contract by which it was agreed that the Virginia and Tennessee Telephone Company, which is a long-distance line, would not grant connection to any other telephone company in Wytheville and vicinity, and the subscribers of the Wythe Mutual Company are therefore denied this privilege.

The furnace company, which is a subscriber of the Wythe Mutual Company, and which desires long-distance connection, claims that this contract creates an unfair and an unjust discrimination against that company.

FRANCHISE EXTENDED TO ANNEXED TERRITORY.

Our City Attorney has requested me to obtain the following information, and I am writing you to refer same to "The question and answers" department. Does a franchise given any public service corporation carry with it the same right and privileges to new territory acquired by the city, after the franchise has been granted and during its life? It is the writer's opinion that this depends entirely upon the wording of the franchise. Unless it is so worded as to preclude this, the privilege follows the city limits. He wishes references as to decisions that he may have definite information on the question. C. W. E.

THE legal editor believes you are correct in your opinion. The question depends upon the wording of the franchise, and unless it is so worded as to preclude such a construction, the privileges granted by the franchise follow the limits of the city. The latest case in point on this subject, and the only one referring directly to a telephone company's franchise is the case of People vs. Chicago Telephone Company, 77 N. E. 245. In that case an ordinance of the City of Chicago granted to the Chicago Telephone Company the right to use the streets within the limits of the city for twenty years and required the company to file with its acceptance of the ordinance a schedule of rates for service "within the limits of the city," and prohibited the company from increasing such rates to its present or future subscribers. In compliance with the ordinance the company filed a schedule. Afterwards there was annexed to the city other territory which had previously been within the limits of other minor municipalities, such as towns and villages, which upon annexation ceased to exist. These towns or villages had previously granted the company the right to use their streets for telephone business upon certain conditions, but without restriction of time or condition as to rates. Upon the annexation the company claimed that it had acquired vested contract rights in the annexed territory under the ordinance of the municipalities that formerly existed there, and that these contract rights were not affected by the ordinance of Chicago and that in the annexed territory the restriction as to rates contained in the Chicago ordinance did not apply. The City of Chicago instituted a suit for the forfeiture of the franchise of the telephone company, and in this case it was held that on the annexation to the city of other towns and villages their local ordinances terminated and the telephone company was bound to furnish telephone service in such localities under its original city ordinance. In the same case it was decided that the telephone company was not entitled, after the annexation, to limit its service at the rates fixed in the ordinances to the same kind of service that had been in existence when the original grant from the City of Chicago was made.

Other cases bearing upon the same question are as follows: Illinois Central R. R. Co. vs. Chicago, 176 U. S. 646, 20 Sup. Ct. 509, 44 L. Ed. 622; Indiana Ry. Co. vs. Hoffman, 161 Ind. 601, 69 N. E. 399; McCallie vs. Mayor, 3 Head 317; St. Louis, etc., Co. vs. St. Louis, 46 Mo. 121; Town of Toledo vs. Edens, 59 Ia. 352, 13 N. W. 313; Town of Milwaukee vs. Milwaukee, 12 Wis. 93; 20 Am. & Eng. Ency. of Law, 1152; Regina vs. Cottle, 3 Eng. L. & E., 474; People vs. Deenan, 153 N. Y. 528.

THE TEXAS ANTI-PASS LAW AGAIN.

If the Texas new Anti-Pass Law applies to local telephone exchanges as well as long distance lines, would a corporation operating two different exchanges of similar character and size, giving service under substantially similar circumstances and conditions, using the same kind of apparatus and at approximately the same cost of maintenance, be compelled to charge the same for service in one town as it charges in the other town? J. A. B.

IT is our opinion that the facts as stated in the above question require the company to charge the same rate in one town as it charges in another, the services rendered and conditions being similar in each.

SUIT FOR GROSS EARNINGS TAX.

ACTION has been begun by the State of Minnesota in the Hennepin county courts to compel the Northwestern Telephone Company to pay a tax of $5,355.95, said to be due under the gross earnings tax law for the year 1904. The State asserts that the company failed to comply with all the requirements of the law in filing its list of earnings and says that about $178,532.13, collected on tolls, outside exchanges, messenger service, sale of material and similar items, was not reported.

FAILURE TO TURN IN FIRE ALARM.

ON the night of July 4 last the plant of the Lanham Lumber Company at Lebanon, Ky., was almost totally destroyed by fire. The company has now commenced a damage suit against the Lebanon, Louisville and Lexington Telephone Company, a branch of the Cumberland Telephone and Telegraph Company, which operates an exchange at Lebanon. The plaintiff alleges that its night watchman could not get the exchange operator to answer his call for the fire alarm until after several efforts and that when his calls were responded to the plant was doomed. The lumber company asks that it be allowed $22,000 damages.

TESTING RAILROAD COMMISSION'S RIGHT TO FIX RATES.

THE power of the railroad commission of Louisiana to fix the rates for local telephone service is the basis of an appeal by the commission to the supreme court of the state, the record having been filed Sept. 23. The rates fixed by the commission were so low that the United States circuit court for the Eastern district of Louisiana, upon the application of the Cumberland Telephone & Telegraph Company, enjoined the commission from enforcing the rates on the ground that they were practically confiscatory.

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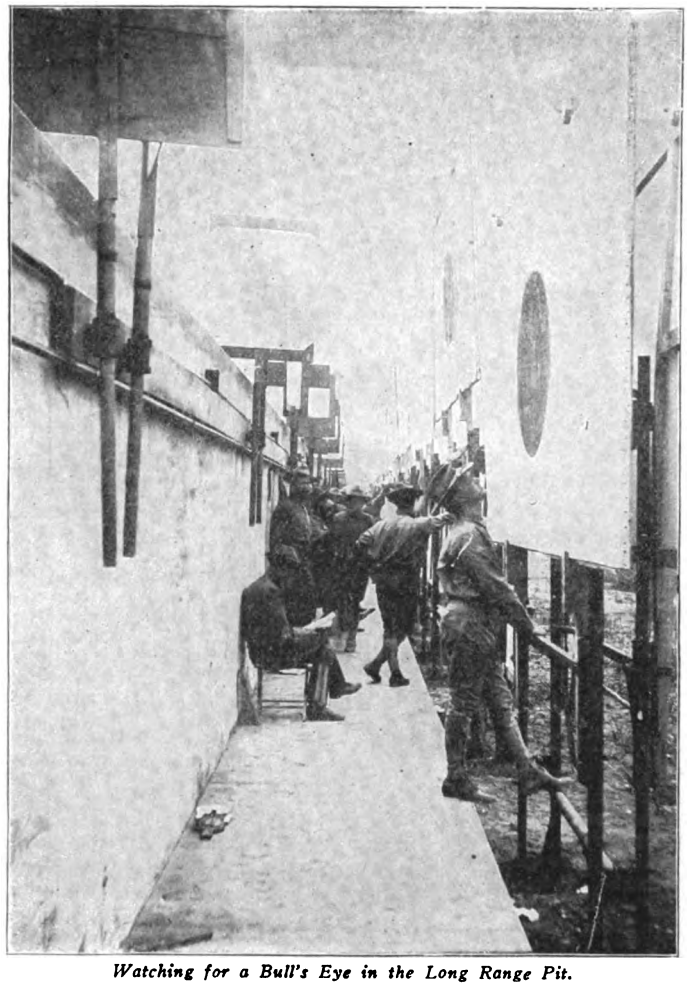
Bringing Scores to the Firing Line

By F. A. Cornell.

THE successful use of telephones in the Japanese army during the late war with Russia has thoroughly aroused the United States War Department to the advantages of such means of communication and this enthusiasm has imbued the National Guard of several states with a similar determination to develop the best facilities in this line. This policy includes the use of telephones in rifle-range equipment as well as making it play an important part in the complicated signalling devices of sham manoeuvers.



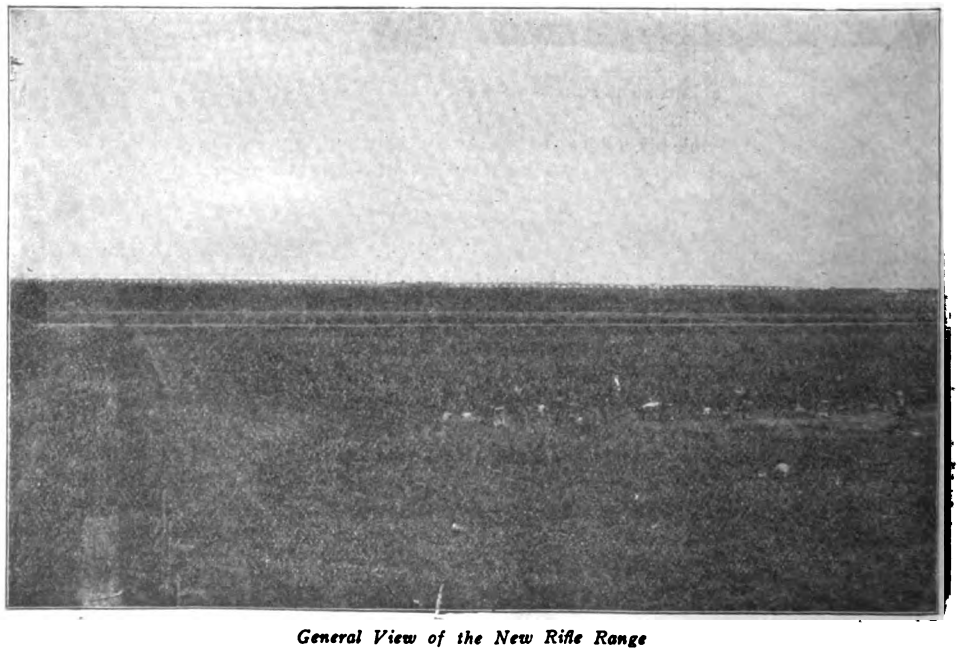
Watching for a Bull's Eye in the Long Range Pit.

Camp Perry, Ohio, has been so well equipped with modern appliances that the National Shoot was held there during the late summer and early fall. Part of this equipment included over two score complete telephone circuits for use in reporting each shot from "Pit" to "Firing line." These were operated by the Signal Corps of the Ohio National Guard and, while they are really an adjunct to the regular reporting routine, their value in case of delays and misunderstandings was very evident and rendered them indispensible. On the long ranges, from 1,000 yards up, the opportunities for their use are, of course, vastly increased, and in such instances they enable the range officers to dispense with the services of a large detail of mounted orderlies.

On the firing line the instruments are mounted on suitable desks about eight yards in the rear of the competitors, and about five yards from the rear of the scoring tables. The telephone desks are distinctly shown in the general view of the range. Standard government field sets, manufactured by the Dean Electric Company of Elyria, Ohio, are used, and the wiring is laid through underground ducts. Each instrument in the "Pit" is in charge of an operator, and there is a complete circuit from target to firing line for each fifth range.

When a team takes its position on the range the officer in charge is continually advised of the exact state of affairs in "The Pit" (where the targets are handled) by the use of these field sets. Red markers are raised in front of the target when they are not in use, and at the command of the officer in charge of the range, transmitted over the telephone to the officer in charge of the pit, these markers are removed and the first volley fired. The targets are arranged on rollers, two per set, and so constructed that when one is in position the other drops down into the pit below the protecting bank of earth on the side facing the firing line. After each shot the position of the "hit" is indicated to the scorers, who are located two yards in the rear of the firing squads, by placing a metal disc marker on the hole in the target. These discs are of various colors—white for bull's eye, white cross on black ground for four points, and black for three, while the red range flag is waved in front of the target in case of a miss. Should the scorer fail to get the report of any shot the signal corps telephone operator at the firing line rings the pit and calls for "last shot on range No. 65," or whatever the circumstances may require. Detailed information over the line enables the scorer to keep his records up to scratch, and gives the competitor the advantage of the exact location of his shot, so that he may make proper sight adjustment or wind allowance.

The telephone instruments used for this service are compact and at the same time complete. The cabinet provides space for two No. 6 dry cells, a three-bar ringing generator, a ringer, an induction coil, and a hand microphone set. This microphone is of an improved pattern which combines convenience in using with strength and freedom from trouble. The body of the set is of aluminum, and the receiver and transmitter shells are of nickel-plated brass, to properly protect those parts against the most inclement weather. Each set is provided with a circuit diagram which enables even a layman to connect and operate the apparatus at will.



General View of the New Rifle Range

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THE FIRST MICHIGAN DISTRICT MEETING.

AN enthusiastic meeting of District No. 1 was held at Howell, Mich., on Tuesday, October 22d. There were about twenty-five representatives present and the discussions were of a local nature entirely, with the exception of President Fisher's address relative to ad valorem taxation, in which he urged that all companies interested in Independent telephony should see their respective Senators and Representatives and show them wherein it would work great harm to the Independent companies if such a bill as the Duck or Kinane Bill should become a law.

Mr. J. P. Boylan, superintendent of service of the Inter-State Long Distance Telephone Company of Detroit, gave a very interesting description of the new Detroit plant, the title of this paper being "The Model Plant." Mr. F. V. Newman, president of the Independent Telephone Managers' Association, described the workings of that association and what they expected to accomplish, calling attention to the convention which is to be held at Battle Creek, Michigan, on November 13th and 14th. A short address in which he related his experiences in the Northwest, was given by Mr. N. F. Wing, secretary-treasurer of the Farmers' Telephone Company of Grass Lake.

Mr. W. S. Vivian, secretary of the State Association, called the attention of the representatives to the new Rate Book which is now being prepared, and urged the necessity of every office being supplied with one so that uniform rates could be prevalent, according to the Michigan Independent Telephone Traffic Association schedule.

The following officers, delegates and committees were elected: President, J. E. Hisey, secretary-treasurer Laingsburg Telephone Company, Laingsburg; secretary, Miss I. R. Close, manager Oakland County Telephone Company, Pontiac. Delegates to the International Independent Telephone Association: A. B. Fishbeck, district manager Inter-State Long Distance Telephone Company, Detroit. Alternates: C. B. King, general manager Washtenaw Home Telephone Company, Ann Arbor; M. A. Porter, assistant general manager Inter-State Long Distance Telephone Company, Detroit. District Committee consisting of one representative from each county represented in the district as follows: Wayne County, C. H. Rauch, general manager Plymouth Telephone Company, Plymouth; Livingston County, R. B. McPherson, director Inter-State Long Distance Telephone Company, Detroit; Oakland County, Chas. Bartlett; Clinton County, C. C. Woodruff, manager Laingsburg Telephone Company, Dewitt; Shiwassee County, H. T. Clough, district manager Union Telephone Company, Owosso; Genessee County, W. H. King, manager Union Telephone Company, Fenton; Ingham County, F. C. Hughes, manager Citizens' Telephone Company, Lansing; Lapeer County, Lee G. Smith, secretary Mutual Telephone Company, Attica.

Legislative Committee.—E. C. Shields, attorney, Inter-State Long Distance Telephone Company, Howell; F. C. Hughes, manager Citizens' Telephone Company, Lansing; W. B. Woodbury, general manager Inter-State Long Distance Telephone Company, Detroit; C. B. King, general manager Washtenaw Home Telephone Company, Ann Arbor; A. G. Griggs, secretary-treasurer Oakland County Telephone Company, Pontiac; Todd Kincaid, president Union Telephone Company, Corunna; C. C. Woodruff, manager Laingsburg Telephone Company, Dewitt.

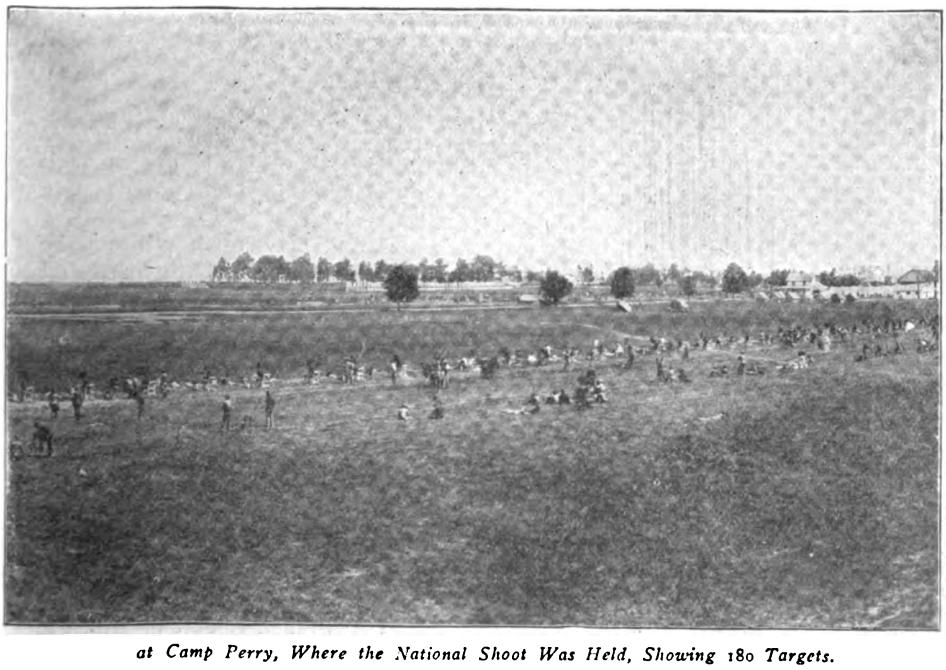
DALLAS URGED TO ADMIT INDEPENDENTS BY NEIGHBORING TOWNS IN TEXAS.

TELEPHONE users in Texas cities and towns having occasion to do business with Dallas are urging the city council of that place to grant a franchise for an Independent telephone company. Complaints of the Bell servive have recently come to a climax and demands for relief are said to be strong. The objectionable conditions are felt in surrounding towns to a considerable extent, and among recent protests is one from the Mayor of Ennis and ten citizens of that place, who have forwarded letters explaining at length the advisability of having two telephone systems in Dallas. The strength of the Independent companies in this place, Weatherford and other towns from which communications have been received, makes it extremely advisable that Dallas should not be without the advantages of connections with other Independent local systems, and the advantages gained by the effect of competition in telephone service.

FLYING FREIGHT CAR ROOF A NEW CAUSE OF TROUBLE ON TELEPHONE LINES.

UPON testing out a trouble reported by a wire chief of a telephone exchange recently it was found that all lines north were crossed and grounded at a point where they were near the railroad. Realizing that something serious had happened, the wire chief started all men available for the trouble. The first one to call in was very much excited, and reported that the top of a freight car had gone through the lines, breaking every wire and crossing the lines up for several sections.

The manner in which the roof of the car became mixed up with the telephone wires can only be imagined. At the point of trouble the lines follow close beside the railway, and the bed of the road is about on a level with the middle of the pole. On one side a mountain cut, and on the other a river. As nearly as can be ascertained, a severely damaged car, which had been in a recent wreck, was being brought in as a part of a freight train while the wind was blowing briskly. It is thought that the speed of the train, combined with the wind, lifted the roof from the damaged car and threw it upon the telephone lines.



at Camp Perry, Where the National Shoot Was Held, Showing 180 Targets.

PACIFIC COAST CRACK STEAMSHIP MAKES TELEPHONE CONNECTIONS.

THE Iroquois, which is said to be one of the finest steamships plying along the Pacific Coast, and covers a line from Vancouver to Bellingham and Seattle, was recently connected with the telephone exchange at Bellingham. Arrangements have been made for carrying a line aboard at other points. A portable telephone set has been placed in the purser's office, and arrangements made for connecting up the line as soon as the ship docks. Passengers may thus save much valuable time.

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Among the Exchanges

POLITICS AND THE TELEPHONE SITUATION IN NASHVILLE.

A NEW mayor has been elected in Nashville, Tenn., where the Home Telegraph Company has been fighting the Cumberland (Bell) for three years, and much interest is manifested in what the new administration will do with the telephone situation. The last legislature passed a law giving telephone and telegraph companies right of eminent domain over all roads of the state and streets of cities in that state on the ground that they were public service corporations. The bill, however, left it discretionary with the city authorities as to what tax should be paid for the privilege of streets and as to whether or not companies should place their wires underground. The Home company put its proposition up to the city council, but the old administration has not yet given a reply as to what it would tax the company, delaying the work of the Independent company nearly a year.

In his message to the city council last week the new mayor, James S. Brown, brought up this question, but made no promises. He did treat the general telephone situation, however, and handed the Cumberland Company a surprise. He recommended that the city council appoint a committee to investigate the telephone rate proposition to determine whether the Cumberland company is charging exorbitant rates for its service. The rates in Nashville are $3.50 per month for residence telephones and $7.50 for business service, which Mayor Brown says are too high. Thus far the city administration has given the Independent company no promises as to terms under which it can enter the city.

INSTALLATION OF INDEPENDENT SYSTEM IN NEW CASTLE, PA., PROGRESSING FAVORABLY.

THE installation of the new common battery equipment of the American Union Telephone Company at New Castle, Pa., is going ahead nicely and it is expected that the cut over will be made at an early date. The exchange is located in a new fireproof building—one of New Castle's best—and it is the intention of the management to have this a thoroughly modern and model plant.

The canvass for new subscribers, which is in charge of C. H. Gogel, contract agent of the American Union Company, is going ahead at a very satisfactory pace. Many unique and effective methods are being employed to extend the subscriber's lists.

PORTAGE LA PRAIRIE, MANITOBA, LIKELY TO HAVE A MUNICIPAL SYSTEM SOON.

MEMBERS of the Board of Trade of Portage la Prairie, Man., at a recent meeting held to consider the service of the Bell Telephone Co., criticized it severely. When it was found that nearly all members were agreed that the service of the company was totally inadequate and useless for the needs of the business men and others, Secretary Baker was instructed to write to the officials of the company at Winnipeg informing them of its officers' opinions and to be explicit as to the opinions of the members. Plans for the construction of a municipal system are being vigorously urged.

LOUISVILLE & NASHVILLE RAILROAD ADOPTS TELEPHONE.

THE Louisville & Nashville Railroad company will hereafter use the telephone on its most important divisions and may ultimately extend the line over the entire system. The line built some time ago from Evansville, Ky., to Guthrie, Ky., using the telegraph wires, has proven entirely satisfactory and this successful test has induced the company to extend the service. Without putting in new wires the company is now installing a service on the Nashville division from Nashville to Columbia, and is working on a line from that point to Birmingham, from Birmingham to Montgomery and on to New Orleans. The work of installing the system will be light as the regular railroad wires are used all along, and all that is necessary is the connecting at each station and attaching the instruments.

The Louisville & Nashville telegraph wires have been taxed to the limit for some time and the management began the experiment with telephones to see to what extent the telegraph lines could be relieved. It worked perfectly on the first trial and relieved the lines fully thirty per cent. All messages between agents and officers not requiring accurate record are handled by telephone and all bulletins as to car supply, data of probable traffic, etc., are handled in this way. Each morning and afternoon the superintendent and his subordinates communicate with each other, relieving the telegraph wires of all traffic except through messages and train orders.

CITIZENS OF CARLISLE, KY., REFUSE TO SELL FRANCHISE TO BELL COMPANY.

IN Carlisle, Ky., the Carlisle Telephone Company, controlled by the East Tennessee Company (Bell), has been operating without a franchise for some years. It recently endeavored to get the City Council to enact an ordinance for the sale of a franchise, drawn in such a manner as to benefit the company. Although the company now has a contract, it desires a franchise to secure its position, but the council seems to be very unwilling to give the desired permission.

WHEN GREEK MET GREEK.

AN incident of interest to construction men occurred at Natchez, Miss., last week when the Cumberland Telephone Company planted a pole after midnight in a hole dug during the previous day by the Western Union Telegraph Company in front of the latter company's office. The Western Union retaliated the following day by planting a pole about twenty feet away in perfect line, making it necessary for the Cumberland company to cut and splice several cables. This arbitrary procedure cost each company several times the value of a pole and neither company profited in any way.

BULLET HOLE TROUBLES OUTDONE BY WASPS IN PUTTING SEATTLE CABLES OUT OF COMMISSION.

"A NEWS item regarding a .22 caliber bullet being found in an aerial cable in your issue of August 24 has attracted my attention," writes C. H. Judson, chief engineer of the Independent Telephone Company of Seattle. "This finding of a bullet in the cable is of such common occurrence in Seattle that we look upon this as ordinary cable trouble. In Seattle a large number of our cables run through thinly settled and wooded portions of the city, and there is a great deal of shooting done in these localities. We find bullets ranging in size from .22 up to .50 caliber from all sorts of guns from target rifles to old-fashioned muskets. It is absolutely impossible for any system of watchfulness to locate the marksman, and so we have settled down to picking the bullets out as fast as the trouble appears.

"There is something else that is worth telling. I have in my possession a piece of cable sheath through which a hole about an eighth of an inch in diameter was drilled by a wasp. This wasp is a large creature about an inch and a half long and seems to be one indigenous to this country. It bores mainly into tree trunks and we find its holes frequently in our poles. In this particular case it had bored straight through the pole from the side opposite the cable. The cable happened to be lying against the pole. The wasp went on after leaving the pole, through the cable sheath and closed its labors when it came in contact with the copper wire. Then having done all that it could do it gave up the ghost and was found partially imbedded in the cable sheath and partially in the pole by the troubleman.

"This is not the famous Australian cable bug which makes

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a specialty of eating lead cables as a steady diet, but it is a curious creature nevertheless.

"I am convinced that the wasp would not have attacked the cable had it not been forced to on account of the obstacle the cable made to its progress. Whether the wasp died from indigestion caused by lead colic or something of that kind, or from the coloring matter in the wrapping of the paper in the core of the cable it is impossible to say, or whether it became discouraged and died purely because it could not conquer the copper wire is a question. It may have been electrocuted.

"I think this can be classed as one of the curiosities of the trouble shooter."

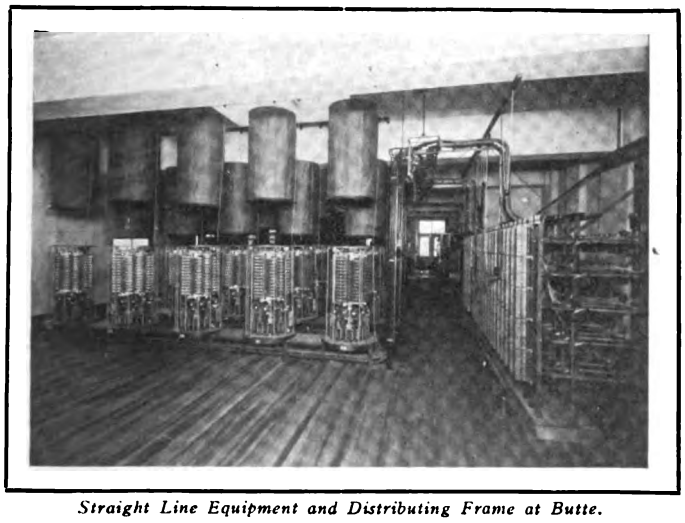
THE NEW INDEPENDENT EXCHANGE AT BUTTE.

(*Concluded from page* 304.)

chief's desk is provided with standard volt meter and testing circuits, such as are commonly used in both automatic and manual exchanges.

One of the most interesting features in the Butte exchange is the "tell-tale" circuit. Not only are all fuses and heat coils throughout the exchange provided with alarms, but also the driving mechanism of the line switches are furnished with visual and audible signalling devices, which call the attention of the attendant at once when anything goes wrong. The party line switches are provided with small semaphores, so that switches in operation can be detected and singled out at a glance.

The telephones, that is, in addition to the standard nickel automatic desk sets, vary but slightly in appearance and finish, all



Straight Line Equipment and Distributing Frame at Butte.

instruments being of the common battery type, and finished in both ebony and antique oak to suit the taste of the subscriber.

The Montana Independent Telephone Company was organized in June, 1906, with an authorized 6 per cent. bond issue of $1,500,000, and a stock issue of the same amount. The territory which the company has under immediate development includes the city of Butte, with a population of 86,000; Anaconda, 15,000; Helena, 20,000; Missoula, 10,000; Great Falls, 18,000; together with connecting toll lines. The company has been granted liberal franchises in all cities of importance included in this territory, and its exchange at Butte, Montana, which, being thoroughly up to date and modern in every respect, stands as a model of high grade work, was opened for service September 16, 1907.

The officers of the company are H. A. Gallwey, president; P. B. Moss, vice-president; C. J. Kelly, secretary and treasurer; Thaddeus S. Lane, managing director. The board of directors are as follows: A. J. Davis, president First National Bank, Butte, Mont.; W. G. Conrad, president Conrad Banking Co., Great Falls, Mont.; P. B. Moss, president First National Bank, Billings, Mont.; C. J. Kelly, manager Hennessy Mercantile Co., Butte, Mont.; Elmer B. Jones, managing director Utah Independent Telephone Company, Salt Lake City, Utah; Thomas Couch, Jr., Great Falls, Mont.; Thaddeus S. Lane, managing director, Butte, Mont.; C. F. Kelley, secretary Anaconda Copper Mining Company. Butte, Mont.; J. T. O'Brien, of Fariss, O'Brien & Rowe, Butte, Mont.; H. B. Brown, manager securities department, Butte, Mont.; F. H. Clinton, superintendent Electric Light & Street Railway Company, Anaconda, Mont.; L. O. Evans, attorney, Butte, Mont.; H. A. Gallwey, manager Parrot Mining Company, Butte, Mont.

In addition to its building at Butte, to be used as a general office for the state, the company will erect its own buildings in Great Falls and Helena. The company has been financed on a conservative basis, and its securities have been taken up readily by Montana investors, all of the money invested in the enterprise being Montana capital. The securities of the company are considered by investors throughout the state as being exceptionally good, and are admitted to be great possibilities for the future. More than 400 Montana investors, representing nearly every large interest in the state, as well as every trade and profession, have put their money into the enterprise.

MARION COUNTY COMPANY, RECENTLY BECOME SUB-LICENSEE, RECEIVES NO AID FROM LOYAL INDEPENDENTS.

APPARENTLY when the Marion County Telephone Company, of Marion, O., entered into an agreement with the Bell ompany it believed that it could continue to send its messages not only over the Bell toll lines but over the Independent long distance lines, with which it hoped to retain connections. When these connections were denied the company a few days ago, it found itself without means of making connections which were demanded by its subscribers in a large section of the state. Demands for connections with the city of Bucyrus, O., were especially strong, and it had no means of filling them, consequently a proposition was made to the Bucyrus Telephone Company that it should join with the Marion County Telephone Company for the building and operation of a joint toll line. The matter was carefully considered by the Bucyrus Telephone Company, which eventually passed the following resolution:

WHEREAS, The Marion County Telephone Company has contracted with the Bell Telephone Company for long distance service, and, as we believe, to the detriment of the interests of the Independent telephone companies, and,

WHEREAS, The Bucyrus Telephone Company being members of the Ohio Independent Telephone Association, it was

Resolved, Upon full consideration of said proposition to decline the same and, further

Resolved, That the Bucyrus Telephone Company decline to enter into any contract with the Bell Telephone Company as suggested by their representative, Mr. Sylvan, for the purpose of eliminating competition. It was further

Resolved, That a copy of this resolution be delivered to the Marion County Telephone Company, Marion, O.

(Signed) THE BUCYRUS TELEPHONE CO.
R. H. MATHEW, Secretary. JOHN A. CHESNEY, President.

This action serves not merely to demonstrate the strong loyalty of the Bucyrus company, but furnishes a typical example of the sound business sense of the average Ohio telephone company. It is generally recognized to be poor policy to relinquish the advantage gained by association with the general body of strong Independent organizations for the temporary slight gains from connection with Cincinnati, the only city of importance which is now reached exclusively by the Bell company.

REMARKABLE GROWTH OF RURAL TELEPHONE SERVICE IN WESTERN PENNSYLVANIA.

INDEPENDENT companies have been so active in Western Pennsylvania for some years past that telephone service in the rural districts is now quite commonly used. In two townships in Lawrence county nearly every farmhouse has a telephone. These telephones are not only useful for business, but for the entertainment of these connected. Among the devices which recently made their appearance is that of a phonograph concert, in which parties in several exchanges participated, connections being made over toll lines when the amount of regular business was small. It has even been proposed to transmit concerts and lectures over a wide territory by the connection of numerous Independent lines to a central transmitter in a town where a lecture course is supported.

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New Inventions

WIRELESS TELEPHONY.

H. A. McCarty, administrator of F. J. McCarty, deceased, San Francisco, Cal., patent 867,896, Oct. 8, 1907, assigned to McCarty Wireless Telephone Company, San Francisco.

This patent on a manner of transmitting speech vibrations without the use of wires comprises an arrangement of apparatus similar to that described in patent 867,895, excepting that the induction coil is constructed with but one primary winding at the center of which a tap is taken to which is connected the interrupter. The latter is in a shunt connection across the circuit including the generator, the arc lamp and the primary of the induction coil.

CIRCUIT FOR COIN-COLLECTORS.

Amos F. Dixon, Chicago, patent No. 867,955, October 15, 1907, assigned to Western Electric Co.

This patent covers a circuit for a combined local and toll coin collector, employing mechanisms similar in general to those described in patents Nos. 728,309 and 846,500. Arrangements are described whereby if the call is for a local connection, the coin will be deposited in the cash box or refunded in the usual manner; if the call is for a toll connection, means are provided for operating signals to inform the operator of the character of the coin deposited.

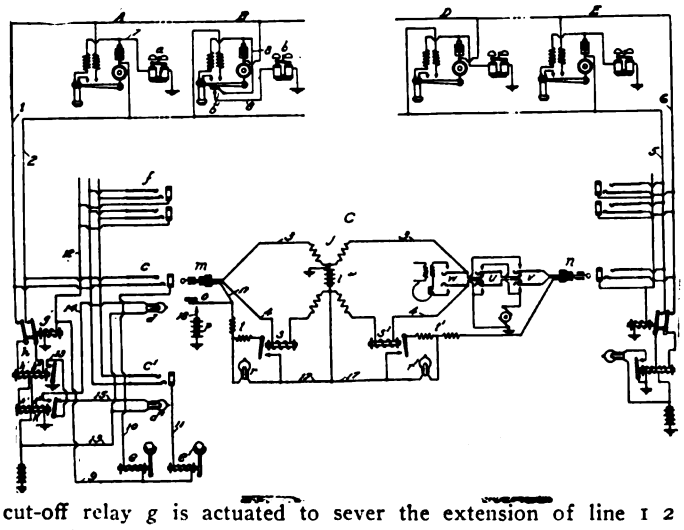
MEASURED SERVICE SYSTEM.

J. L. McQuarrie, Oak Park, Ill., patent 869,449, Oct. 29, 1907; assigned to W. E. Co.

This patent covers an arrangement of apparatus electrically so connected as to provide a system wherein messages transmitted over a telephone line may be selectively registered in order that the charges may be properly proportioned among the different subscribers connected on the same line.

In the exchange system are provided service meter registers, *e* and *e'*, which are electrically associated with the answering jacks and signals; register *e* being associated with jack *c* and signal *d*, while register *e'* is associated with jack *c'* and lamp *d'*.

In operation, when the calling subscriber's line signal appears, the operator inserts the answering plug *m* of a pair of cords into the associated jack, and, upon learning with what station connection is desired inserts the calling plug *n* of the pair into the corresponding jack and applies ringing current to signal the station. In the insertion of the answering plug into the jack, the

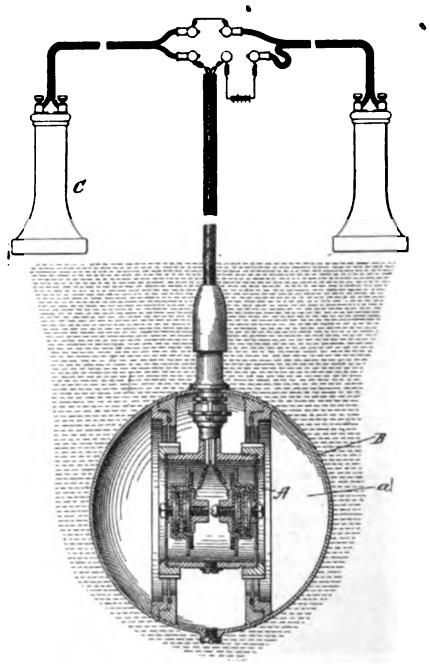


cut-off relay *g* is actuated to sever the extension of line 1 2 through the line relay *h* and differential relay *k* and battery *p* and switch *o* are operatively associated with the circuit of the register corresponding with the signal displayed. When, during the course of connection, it is desired to operate the register and thus charge the service against the station calling, the operator depresses key *o*, upon which current flows through the register associated with the line whose calling signal has been answered.

SUBMARINE RECEIVER AND TRANSMITTER.

A. J. Mundy, Boston, Mass., patent 868,800, October 22, 1907; assigned to Submarine Signal Co., Waterville, Maine.

The device described in this patent comprises a spherical shell *B*, in which is enclosed the double transmitter *A*, which is electrically connected with the receivers *C*. The shell *B* acts to receive the sound vibrations from the water and to focus them upon the diaphragms of the transmitters and also by molecular



action to transfer them to the means for varying electrical resistance actuated by the diaphragms.

POLE-CHANGER.

Ewing McLean, Greencastle, Ind., patent 868,576, Oct. 15, 1907.

The vibratory member of this pole changer is preferably constructed of insulating material and pivoted in an ordinary hinge joint. An armature is affixed to one side of the vibrating member, which carries a suitable contact piece for an interrupter in the local circuit of the operating magnet. On the opposite side from the magnet, about midway of the vibrating member, is attached a controlling spring. At the end opposite the pivot, engagement is made with two retractive springs adapted to swing to one side or the other to make contacts with other springs set in proximity with them. The two springs engaging the vibrator are connected to the ringing battery, and combinations of the other springs with which they make contact are so arranged as to provide for sending out on the line positive pulsating, negative pulsating and alternating currents.

LIGHTING ARRESTER.

C. I. Stocking, Hiawatha, Kans., patent 869,031, Oct. 22, 1907; assigned one-half to A. J. Stevens.

The lightning arrester described in this patent is one which is, so states the inventor, very simple and compact in construction, completely dust and moisture proof, and one in which the heavy electrical discharge can readily pass to ground without danger of setting fire to surrounding inflammable material. The specifications for construction and claims are as follows:

A lightning arrester, comprising a tubular casing of conducting material, and having caps of non-conducting material, a connection between the casing and the ground, a conductor within the said casing, a perforate tubular non-conductor interposed between the said conductor and the said casing, and contacts secured on the inner faces of the said caps and having their ends in contact with the ends of the said conductor, the outer ends of the said contacts being adapted for circuit connection.

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GRAY PAY STATIONS PAY

WHY?

Quick Service and Low Maintenance

With Gray Stations You Simply Drop in the Coin

NO LEVERS OR SPRINGS

GRAY TEL. PAY STATION CO.

HARTFORD, CONN.

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THE IMITATORS' WAY

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

POSITION WANTED by switchboard and instrument man; 11 years' experience on magneto systems. good reference; temperate, age 24. South or Southwest preferred. Address Box 964, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 964

WANTED—Fifty students for instruction in Practical Telephony by experienced engineer. Student graded according to present knowledge. Special price now fifty cents per lesson. SCHOOL OF TELEPHONY, Box 1135, Oklahoma City, Oklahoma. 965

EXCEPTIONAL business opportunity for practical telephone man with some capital to invest in new construction and manage an Independent telephone system of exchanges, toll lines and 500 'phones connecting six towns in a growing, prosperous wheat and timber country. Address 315 Empire State Building, Spokane, Wash. 967

WANTED--Continued

WANTED—Position with progressive Independent telephone company by competent man having nine years' practical experience. Address G. W. Kent, 330 East Rich street, Columbus, Ohio. 966

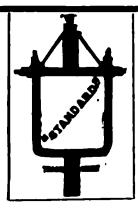
WANTED—Six good common battery switchboard installers. Give reference and state fully experience. Also state rate of wages per hour expected. National Telephone Co. of West Virginia, Wheeling, West Va. 962

WANTED—$5,000, 5 to 10 years' time, 6 per cent. interest. Interest payable annually or semi-annually. Security gilt-edge. Address Box 945, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 945

CABLE SPLICER wants position. Several years' experience in Telephone, Telegraph and Power Work. Best of references. South or West U. S. preferred. State wages, etc. Address Box 942, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 942

WANTED—Position. Thirty-three years of age, with 4 years' technical training; 7 years' practical experience, from hole digging to Long Distance Construction, Exchange Installation and Management. Address Box 943, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 943

EXPERIENCED telephone accountant and auditor desires position with more room for advancement. Can systematize your business and give you results. If looking for thoroughly reliable and competent man, I can suit you. Address, Box 963, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 963

Telephone Wire  **and Cables**

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables — **Aerial—Underground—Submarine Lead Covered Cables**

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company

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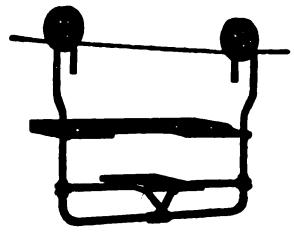
Boston. New York. Philadelphia. Atlanta, Ga. Chicago. St. Louis. San Francisco, Cal. Los Angeles, Cal.

SAFETY--The Important Characteristic of SECURITY MESSENGER CABLE CARS



Of course the design—the workmanship—and the adjustable wooden seat—have considerable to do with it, but the one big reason for its popularity is the fact that SECURITY CARS ARE SAFE.

The price without the table is $7.50, but during November only we will include the table at this price.

THE F. BISSELL COMPANY, TOLEDO, O.

1889—Paris Exposition Medal for Rubber Insulation 1893—World's Fair Medal for Rubber Insulation

OKONITE

TRADE MARK REG. U.S. PATENT OFFICE.

Tbo Standard for Rubbor Insulation

Okonite Wires, Okonite Tape, Manson Tape, Candee Weather-Proof Wire

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Sole Manufacturers

WILLARD L. CANDEE, H. DURANT CHEEVER, } Managers

GEO. S. MANSON, Superintendent
W. H. HODGINS, Secretary

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With the Manufacturers

MANUFACTURERS INVITED TO NOTIFY CUSTOMERS WHERE THEY WILL BE FOUND AT THE ELECTRICAL SHOW.

HOMER E. NIESZ, manager of the Electrical Trades Exposition Co., has suggested an interesting plan for notifying readers of the technical journals which manufacturers of telephone and electrical goods will have booths at the Electrical Show. The idea is for each exhibitor to agree to insert in his advertisement a reference to his exhibit.

Mr. Niesz is supplying postal cards to all technical press advertisers. These cards may be mailed to the papers the advertiser carries space in, and have printed instructions advising the paper to insert such a line.

Manufacturers as well as the Electrical Show will derive the benefit from this publicity. AMERICAN TELEPHONE JOURNAL will be pleased to insert a line for any of its advertisers upon receipt of the information and the request to use it in this manner.

THE INDEPENDENT PLANT AT MOBILE.

THE Mobile Register, a leading newspaper of Mobile, Ala., has recently published a special issue describing the important business enterprises of the city. Among those which received most prominent and interesting mention was the Home Telephone Co. Reference was made to the extensive improvements which were begun during the early part of last year, including the installation of new central office equipment in a new building, and the placing of all wires in the business district underground. By January 1st of the present year the system was in operation.

Special attention is paid in the article to the equipment of the exchange, mention being made of the completeness of the provision for giving a high grade of service, the protection of the operators, employees and the subscribers against electrical shocks, and the efficiency of the devices for accomplishing the various operations of making telephone connections. The entire exchange equipment referred to was furnished and installed by the Dean Electric Co., of Elyria, O.

MR. A. C. BELL, who has been in charge of the patent department of the Stromberg-Carlson Telephone Manufacturing Company, has recently accepted a position in the offices of Brown & Williams, 1550 Monadnock Block, Chicago, Ill., where he will give his attention to the work of patent soliciting. In addition to his several years' work in soliciting patents, Mr. Bell, who is a graduate of Cornell University, has had practical experience as a mechanical and electrical engineer, and so will be able to give patent applications proper consideration from several points of view.

CHINESE OFFICIALS INVESTIGATE TELEPHONE SYSTEMS.

REPORTS come from Columbus, Chicago and Grand Rapids of the visits of two prominent officials stationed at the Chinese Embassy in Washington to investigate the working of automatic telephone apparatus. It is reported that they are making this investigation for the Chinese Government.

CRACRAFT-LEIGH ELECTRIC COMPANY, of Genoa, Ill., has recently sold equipment for a new telephone exchange to the Sabetha Mutual Telephone Company, of Sabetha, Kans.

THE SWEDISH AMERICAN TELEPHONE COMPANY, Chicago, Ill., has established in connection with its main office at Chicago a Bureau of Information for the benefit of its friends and customers. The purpose of this bureau is to advise inquirers concerning all questions about the operation of their exchanges and lines. Information will be furnished by experts in telephone construction, maintenance and operating, concerning the proper way of locating trouble or remedying any defects which may occur in the system.

THE VOTE-BERGER COMPANY, La Crosse, Wis., manufacturer of the ballast common battery switchboard, reports the closing of a contract with the Home Telephone Company, of Dayton, Ohio, for a three position, non-multiple "ballast" switchboard to be installed at Miamisburg, Ohio.

The Dayton company is reported to have made a careful and thorough investigation of the Ballast system in operation at Grand Rapids, Wis., and adopted this type of board on account of the simplicity of the circuits and the entire absence of relays in the board.

AMERICAN ELECTRIC FUSE COMPANY, Muskegon, Mich., calls attention in some recently issued advertising leaflets to a number of interesting points in connection with its fuses and lightning arresters. Full information concerning this line of protective equipment will be furnished to interested persons upon receipt of a request.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., has included full information about its types of "Central Energy" desk stands for subscribers' stations, in a single folder. The booklet gives a very complete idea of the construction and finish of the apparatus by means of well arranged illustrations.

THE AMERICAN CONDUIT COMPANY, 140 Nassau street, New York, has issued the fourth postal card bulletin in the series giving concrete costs. This time it gives a curve for cost of sand in concrete mixed according to each of four given proportions. In making up the curves the cost of sand per cubic yard, in dollars, is plotted vertically, and the cost of sand per cubic yard of concrete, in dollars, is plotted horizontally, so that when the cost of the sand is known and the proportions of the mixture, one has only to follow the vertical line upward until it intersects the curve to know the cost of sand per cubic yard of tamped concrete. This bulletin in connection with Nos. 215, 217 and 220, on the cost of labor, cement and stone, furnishes a very interesting and useful group for the notebook of every manager or construction superintendent.

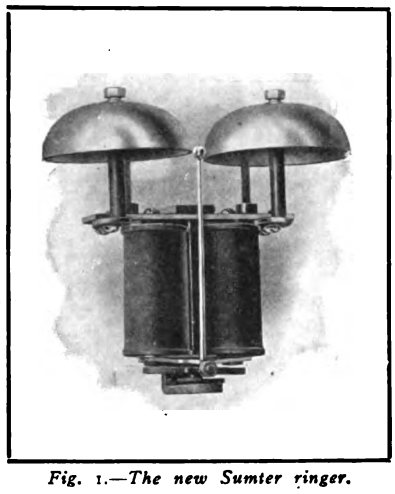

Fig. 1.—The new Sumter ringer.

A HAND-ADJUSTABLE RINGER.

FACILITY of adjustment without the use of any tools whatever was the object sought in the design of the ringer shown in complete form in Fig. 1 on this page. The various parts are assembled in the standard manner, gongs being mounted on posts which are adjusted by means of machine screws, no special wrenches being necessary. After the gongs are once set, however, and this is usually done in the factory, the manufacturers say that they seldom require adjustment. In this particular ringer all adjustments necessary when the ringer is in service can be accomplished by moving the armature up and down, and for this no tools are required.

The armature carrying the striker rod is mounted upon a cross yoke, which is given an initial upward tension away from the ringer spools. A stem passes through this cross yoke down to the supporting plate, and the outer end of the stem is equipped with an adjusting wheel, as shown in Fig. 2. By turning this

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A THIRTY DAY OFFER

Do not leave this line if reported "busy." We mean to help **every manager** and **each subscriber** who has not yet helped himself.

For many months other managers have had great increase in **gross revenue, but greater increase in net revenue.**

As a result of the **adoption** of the **Easophone** new subscribers were obtained. Old ones took additional instruments. Maintenance costs were reduced. Cases of "trouble" one quarter of that with same number of instruments of old type.

And why? Because it is the one 'phone never in trouble.

For magneto and common battery systems. Our offer is made to the large company, small company and the individual.

Write now for it.

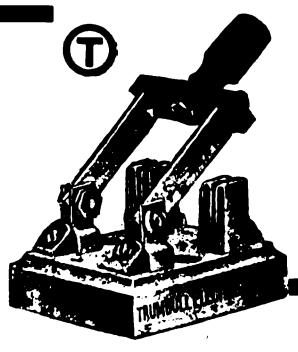
THE WIRE & TELEPHONE CO. OF AMERICA

ROME, N. Y.

Manufacturers of Telephones, Telephone Supplies, Bare Copper, Annunciator, Magnet and Rubber Covered Telephone Wire.

See Our Exhibit at the Electrical Show, Chicago, January 18-25, 1908.

TRUMBULL TELEPHONE SWITCHES



PRICE GREATLY REDUCED

CAT. No.		LIST	STD. PKG.
707	S.P.S.T.	$ .20	150
708	S.P.D.T.	.32	100
709	D.P.S.T.	35	100
710	D.P.D.T.	.50	50

SUBJECT TO YOUR REGULAR DISCOUNTS

WRITE FOR BULLETIN

SELF-ADJUSTING CLIPS HELD FIRMLY IN RECESSES IN THE BASE INSURE A PROPER ALIGNMENT

SELECTED PORCELAIN USED EACH SWITCH INSPECTED

THE TRUMBULL ELECTRIC MFG. CO.

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Lightning Effect No. 3

Sudden Static Induction Due to the Charging of an Adjacent Line

CORRESPONDING to the electrostatic potential between cloud and ground as shown last week in Lightning Effect No. 2, an electrostatic charge exists on the line.

¶ Every lightning flash in the cloud, and between cloud and ground, represents an abrupt change of the electrostatic potential and requires a rearrangement of the electrostatic charge on the section of the line below the cloud.

¶ Thus, during a thunderstorm a series of impulses travel along the line, increasing in severity and frequency with the approach, and decreasing again with the recession of the storm.

¶ These impulses or waves usually travel considerable distances, thus charging the line to an abnormal potential throughout its entirety.

¶ Where a line so charged parallels another line this potential unbalance is communicated to the adjacent line by inductive means.

¶ Should the insulating properties of the line so charged by induction be lower than those of the line bearing the electrostatic charge, a discharge will occur between the lines.

¶ This disruptive charge will, unless provided for, go to ground through the point at which the insulating properties are lowest.

¶ The passing to ground of this discharge usually culminates in the destruction of some portion of your line or exchange equipment.

SKY ROCKET ARRESTERS

provide an easy path to earth for all high potential discharges and assure at all times immunity from the evils of lightning, and

THEY ALWAYS PROTECT.

Cost Small—Savings Large

Write to-day for sample

CHANCE MFG. CO.

CENTRALIA, MO.

EFFECT No. 4 NEXT WEEK

See Our Exhibit at the Electrical Show, Chicago, Jan. 18-25, 1908.

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wheel the armature is brought nearer to or carried farther away from the pole pieces. The adjusting wheel can be turned with the fingers alone, as shown in Fig. 3, thereby adjusting the ringer while in actual operation. By reference to Fig. 2 it will be seen that the adjusting wheel is provided with slots in which can be inserted an ordinary screw driver, a key, or any other article suitable for turning it, and these slots will not become injured by constant use, like the slot in the head of an ordinary screw or the end of a nut. On long or heavily loaded lines where a careful and close adjustment is required, any object such as an ordinary nail can be used to move the adjusting wheel a very short distance. The manner of making such a fine adjustment is shown in Fig. 4.

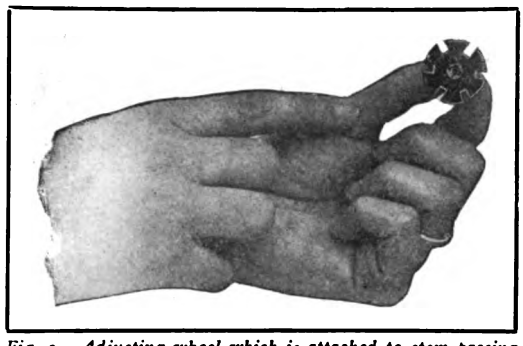

Fig. 2.—Adjusting wheel which is attached to stem passing through cross-yoke.

By turning the adjusting wheel all the way up and removing screws from the magnet and coils the entire ringer may be disassembled, as shown in Fig. 5. The coils can then be easily rewound, as the parts are not forced together under pressure, nor are the coils used to support any of the other parts.

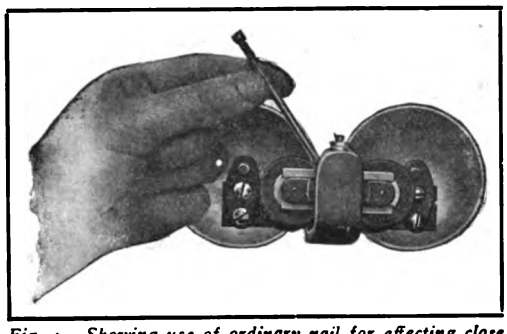

Fig. 4.—Showing use of ordinary nail for effecting close adjustment of ringer.

Aside from the mechanical advantages of this construction, a distinct gain in electrical efficiency is claimed by the manufacturers on the ground that insomuch as the iron parts of any ringer are subject to a magnetic reversal, which takes place during each revolution of the generator armature, the more iron parts there are the less sensibility the ringer will possess. In this ringer all side rods, iron posts and other parts are eliminated, and in addition the adjusting wheel is made of soft iron. Being placed directly between the end of the magnet and the armature itself, it serves to conduct the magnetic lines of force directly from the magnet to the armature to magnetize it to a greater degree than has heretofore been possible, and thereby secure a maximum efficiency. It is said that a distinct gain in sensibility and strength of stroke has been noted, due to this effect.

The ringer referred to is manufactured by the Sumter Telephone Mfg. Co., of Sumter, S. C., and is furnished by this company on all its telephones. The company will be pleased to send descriptive bulletins on request.

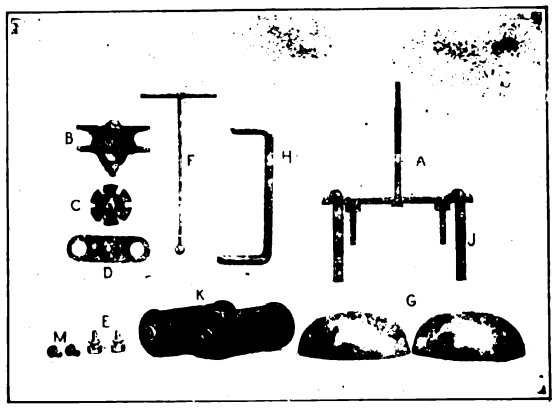

Fig. 5.—Parts of new Sumter ringer, disassembled.

PROMINENT EXHIBITORS AT THE CHICAGO ELECTRICAL SHOW.

IT seems to be a cause for universal satisfaction that the Twelfth Annual Convention of the International Independent Telephone Association is booked for the Coliseum during the Chicago Electrical Show, January 21st, 22d and 23d, 1908. Looking forward to the largest and most enthusiastic convention ever held, the manufacturers of telephones and telephone apparatus have rushed for space, and the entire annex has already been assigned to this class of exhibits. In the remaining portion of the building, devoted to other lines of electrical manufacture, about two-thirds of all the space available has been taken, which assures a larger and more comprehensive show than any of its predecessors.

It is intended to hold the sessions of the telephone convention in the spacious hall in the Coliseum Annex, directly above the telephone exhibits. Access to this hall may be had from a separate outside entrance, so that direct entrance may be had to these meetings by all delegates in attendance. For the convenience of delegates a special admission door opening directly into the annex, containing the telephone exhibits, will be maintained during the telephone convention. The annex is on the same floor level and connected with the main exhibition hall through two wide doorways.

A new departure has been made this year in the method of installing booths and electrical work for exhibitors. A uniform scheme of booth construction has been adopted, and will be installed complete by the exposition company ready for the exhibit, thereby saving exhibitors a great deal of trouble and expense. The booth construction and the decorations and lighting of the building have been designed by D. H. Burnham & Co., the well known architects, who have arranged for a very artistic and effective treatment of the entire building.

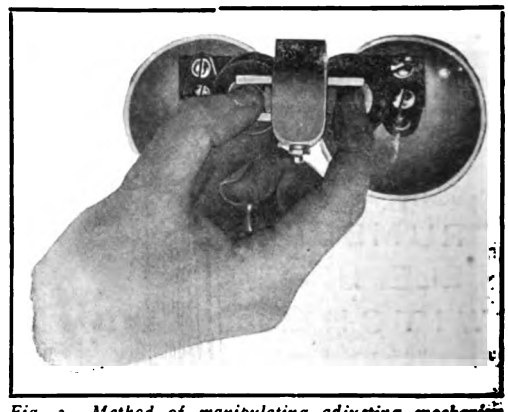

Fig. 3.—Method of manipulating adjusting mechanism with the fingers.

Attached is a partial list of exhibitors of telephones, and telephone apparatus.

American Electric Fuse Company, Muskegon, Mich.; American Telephone Journal, New York City; American Electric Telephone Co., Chicago, Ill.; Automatic Electric Co., Chicago, Ill.; Century Telephone Construction Co., Buffalo, N. Y.; Central Telephone & Electric Co., St. Louis, Mo.; Chicago Telephone Supply Co., Elkhart, Ind.; Corwin Telephone Co., Chicago, Ill.; Dean Electric Co., Elyria, Ohio; Frank B. Cook Co., Chicago, Ill.; Graeber-Entriken Mfg. Co., Philadelphia, Pa.; Hepburn Telephone Co., Chicago, Ill.; International Telephone Mfg. Co., Chicago, Ill.; Monarch Telephone Mfg. Co., Chicago, Ill.; North Electric Co., Cleveland, O.; Sterling Electric Co., Lafayette, Ind.; Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.; Stoltz Electrophone Co.; Swedish-American Telephone Co.; Vote-Berger Co.

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THE CALCULAGRAPH

INCREASES TOLL BUSINESS

Because subscribers are better satisfied with the service. Operators can devote the time formerly occupied in figuring and writing toll charge tickets to getting satisfactory and quick connections for patrons. Service is thus better when the Calculagraph is used, and if quick, satisfactory service is given, subscribers will use toll service to a greater extent.

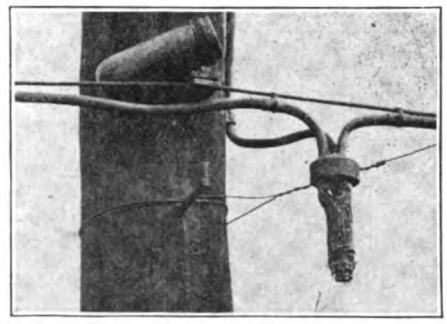
IT MAKES NO CLERICAL ERRORS

Get Our Reason Why Booklets.

CALCULAGRAPH COMPANY

1437 JEWELERS BLDG., NEW YORK CITY

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.



MAKING TESTS IN TELEPHONE CABLES

WHERE HARGIS JOINTS ARE USED

Take your pair of spanners, unscrew the pot from the ring, unlace the pairs and spread them out like a fan. You can then test any of the pairs with greater ease than you can test pairs on the outside layer of a Horizontal Wiped Joint. When test or repair is finished, all that you have to do is to screw the pot on to the ring and tighten with a pair of spanners, and you have a perfect moisture-proof joint. It is not necessary to drag the cable platform, block and tackle, below torch, etc., from one joint to another.

The expense of a groundman can be eliminated when looking for trouble or making tests when Hargis Joints are used. These are only a few reasons which demonstrate the advantages of the Hargis Cable Splicing Joint.

If you are considering new cable construction or wish to change your Horizontal Wiped Joints to Hargis Joints, on account of their convenience, write us to-day. You will save time and money. You will improve your cable construction.

W. N. MATTHEWS & BROTHER

Manufacturers of Patented Specialties

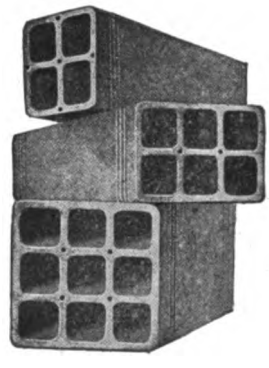
214 N. 2d St., St. Louis, Mo.

Branches: New York, San Francisco

See Our Exhibit at the Electrical Show, Chicago, Jan. 18-25, 1908.

VITRIFIED

CLAY CONDUIT



SINGLE and MULTIPLE DUCT

IMMEDIATE DELIVERY ON ALL STANDARD SIZES

Factories: New Jersey, Pennsylvania, Ohio

Standard Vitrified Conduit Company

Main Offices: 39-41 CORTLANDT ST., NEW YORK, N. Y.

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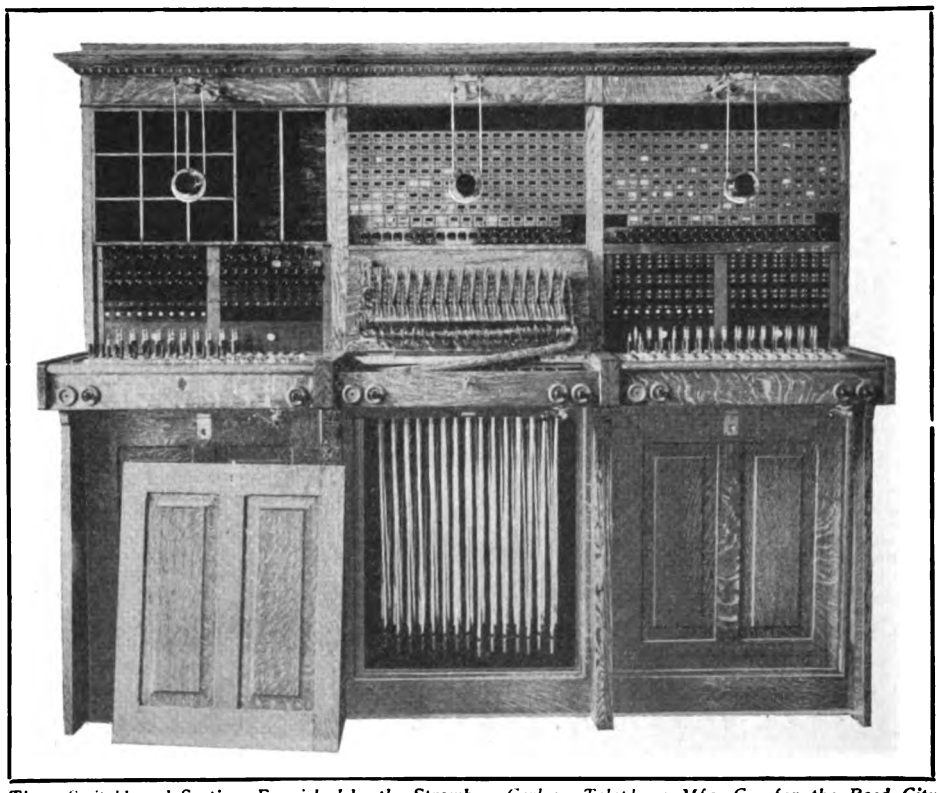
With the Manufacturers

SOME FEATURES OF A MODERN SWITCHBOARD.

AN opportunity to call attention to a number of the points which characterize the construction of one of the types of high grade switchboard manufactured for Independent telephone companies at the present time is afforded by the accompanying photograph which was taken in the factories of the Stromberg-Carlson Telephone Mfg. Co. before shipment was made. The illustration shows a board set up for the exchange at Reed City, Mich., owned by the Citizens' Telephone Co., of Grand Rapids. All equipment is installed, with the exception of the material which must be added at the place of installation, the board having been photographed when it was practically ready for crating.

The cabinet has all the well known features of high grade construction and finish embodied in standard Stromberg-Carlson switchboards. The keyboard, which is constructed of quarter sawed oak, is laminated so that a sectional view would show a five-ply construction, which insures strength and freedom from warping. The plug shelf is covered with leather one-eighth of an inch thick and the pilot rail has a covering of one-sixteenth of an inch double leather to prevent marring from falling plugs. The condenser shelf in this switchboard is mounted three inches above the floor of the cabinet, leaving a clear runway for cables from all sections. Panels provided on the side of the cabinet opposite the cable runway are easily removable, so that no changes involving serious expense or introducing a liability of seriously marring the board, are necessary at the time of making an addition.



Three Switchboard Sections Furnished by the Stromberg-Carlson Telephone Mfg. Co. for the Reed City Exchange of the Citizens' Telephone Co., Grand Rapids, Mich.

The Stromberg-Carlson Telephone Mfg. Co.'s engineers have devoted careful attention to the arrangement of terminals of local switchboard circuits, cabling, etc., in such a way so as to minimize the possibility of trouble due to faulty installation and make the work of the installer and maintenance man as simple and easy as possible. All lines and transfers are terminated on tinned punchings laid out to conform to these requirements of orderliness and accessibility. Easy access to wiring at the rear of the terminal board and to relays, when they are used, is obtained by taking out the movable panels which are set in place behind the cord weights. These features pertain generally to switchboards of this type.

The precise equipment necessary under the order given to the Stromberg-Carlson Company in this particular case, consisted of three sections of the type of cabinet shown, equipped with 20 1,000-ohm tubular drop equipments; 5 1,000-ohm tubular drop equipments with Waterloo jacks; 40 500-ohm tubular drop equipments; 280 generator call visual signal line equipments; 3 operators' generator equipments. The first section of the board consists of a toll line position while the other two are for regular subscribers' circuits. Wiring at the subscribers' positions provides for the installation of 280 subscribers' lines, 40 farmers' lines and 30 pairs of cords, complete equipment being installed as noted in the preceding paragraph. The toll position is wired for 30 trunk lines, 20 equipped, and 10 Waterloo line circuits of which 5 are equipped. Each position is wired for 20 transfer circuits, with equipment for 10 installed. Equipment for 4-party selective ringing, so wired that the four frequency harmonic system can be used, is provided for all positions. Individual party line keys are installed on each pair of cords at subscribers', operators' positions, while the toll position has a master key which will switch the appropriate frequency on the ringing key of any cord. Ringing keys have local contacts, so that when any key is depressed it will close a circuit through a relay which, when energized, completes the primary circuit in the harmonic convertor. The upper space in the toll position is filled with special pigeon holes for use of the operator in temporarily filing tickets, etc. This switchboard is of the same type as the four position board furnished to the same company last November for Belding, Mich.

Any further information desired about any particular features of switchboards of this type will be furnished by the Stromberg-Carlson Telephone Mfg. Co. on receipt of inquiries from interested persons.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., has been shipping a large number of switchboards recently, especially those equipped with the new self-restoring drop. The following is a list of switchboards recently shipped with telephones: Louter, La.; Sheldon Court, Ithaca, N. Y.; Binger, Okla.; Corydon, Pa.; Berlin Center, O.; Billings, Mont., three switchboards, and telephones; Steamburg, N. Y.; Springfield, Ont.

Magneto switchboards were also shipped to: Edinburg, Ind.; New Houlka, Miss.; Springfield, Ont.; Calhoun, Mo.; West Bryant, Me.; Avard, Okla.

The installation of a common battery, selective, multiple, lamp signal equipment has just been completed at Dunnville, Ont., and a magneto selective equipment is being installed at Caledonia, Ont., telephones being included in orders for both of these exchanges.

DEAN ELECTRIC COMPANY, Elyria, Ohio, has recently published a number of postal cards bearing photographs of the new buildings which are now being constructed. The buildings will double the size of the Dean plant. Interested persons can obtain an idea of the extent of this addition to the Dean factories by writing for a card.

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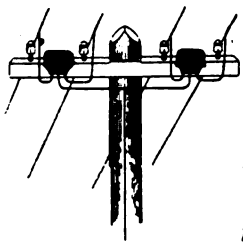

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And assure yourself that comfortable feeling that comes from knowing your equipment is protected against the depredations of lightning.

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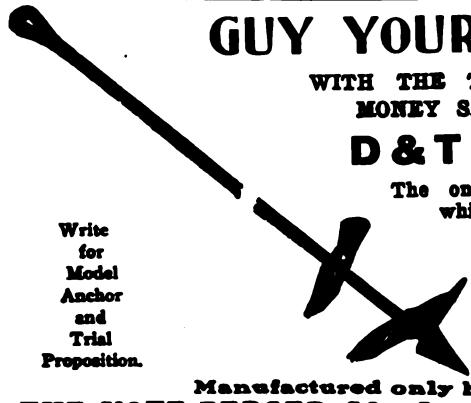

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LOCUST PINS AND YELLOW PINE CROSS ARMS

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Do you want a cheaper wire which will last for years and give good service on lines of ordinary length?

Use Roebling Double Galvanized Telephone Wire

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News Notes That Are New

NEW COMPANIES.

POCAHONTAS, ARK.—Articles of incorporation have been filed by the Ozark Telephone Company, of Pocahontas. It has an authorized capital stock of $25,000, and the incorporators are E. Dalton, who has been named president, M. E. Dalton, T. W. Campbell, G. A. Dorris and J. D. Wells.

HARLAN, KY.—The Harlan Telephone Company has been organized, and expects to construct a telephone line from this city to Hagan, Virginia, a distance of about twenty miles. It has an authorized capital stock of $3,000, and the incorporators are Ira Miller, who has been named manager; H. A. Green, D. F. Smith and others.

SHELBIANA, KY.—The Shelbiana Telephone Company, which has a capital stock of $2,000, all paid in, has been organized by Henry Wright, Lum Johns and Meredith Smith, of Shelbiana. The new company, of which Meredith Smith has been elected manager, contemplates the erection of a telephone system between Shelbiana and Robinson Creek.

POMPEII, MICH.—A local telephone company, which is to be known as the Washington Center Telephone Company, has been organized by the citizens of Pompeii and Washington Center, and the following officers and directors elected: President, Frank Cammeth; secretary, Henry Englis; treasurer, S. N. French; directors, Henry Seivert, Clarence Hensen and J. F. Sutton.

WALTON, N. Y.—Articles of incorporation have been filed by the Walton People's Telephone Company. The capital stock is placed at $30,000, and the following directors have been elected: E. Barnum Guild, William J. Cranston and E. L. Jenks, all of Walton.

CEDAR GROVE, N. C.—The Orange Telephone Company, of Cedar Grove, has been incorporated with a capital stock of $10,000. Its object is to construct, maintain and operate a telephone system in Granville and adjoining counties, and the incorporators are W. R. Roberts, W. M. Arrowwood and others.

GANNVALLEY, S. D.—An Independent telephone company is being organized at Gannvalley. It expects to install a local exchange, and build a number of rural lines.

TREZEVANT, TENN.—An Independent telephone company has been formed at Trezevant, a town about one hundred miles north of Memphis, whose purpose it is to install a telephone system for local and county use. Some of the best financial interests in the town and community are interested as stockholders, and it is expected that a home company will soon be doing business at Trezevant. It is quite probable that connections will ultimately be established with the various rural telephone companies of Independent organization operating in the country adjacent to Trezevant in Carroll, Henry and Weakley counties.

UNICOI, TENN.—Articles of incorporation have been filed by the Unicoi Telephone Company, of Unicoi county. The capital stock is given at $5,000, and among those interested in the enterprise are J. F. Toney, W. A. Roberts, A. R. Brown, J. W. Lucas, R. N. McInturff and others.

NEW LONDON, WIS.—The farmers living south of this city have organized an Independent telephone company, and work on the construction of its system has been commenced.

TISDALE, SASK., CAN.—A new Independent telephone company, to be known as the Tisdale Telephone Company, has been organized, and is planning for the construction and operation of a telephone system between Tisdale and the New Osgoode settlement, about eighteen miles north of this city.

FRANCHISES.

GENESEE, IDAHO.—At a recent meeting of the city council of Genesee, the Genesee Telephone Company, of which H. A. Morgan is manager, was granted a renewal of its franchise.

LACKEY, KY.—A franchise to construct and operate a telephone line along any public road in Floyd county has been granted to the Lackey Telephone Company.

PADUCAH, KY.—In accordance with an ordinance recently passed by the general council, and approved by the mayor, a franchise for the installation and operation of a telephone system and exchange is to be offered for sale at this city, the city reserving the right to reject any and all bids.

PIKEVILLE, KY.—The Eastern Kentucky Home Telephone, of which O. N. Starkey is manager, has been granted a franchise to build its lines anywhere in Pike county. It has just completed a twenty-five mile extension to Williamson, W. Va., and expects to commence the construction of a line to Praise, Ky., at once.

SERGENT, KY.—Application has been made by the Letcher County Home Telephone Company for permission to build lines throughout all portions of Letcher county.

FLINT, MICH.—Application for a franchise has been made at this city by J. W. Martin, of Detroit. The new company which Mr. Martin represents promises, if the franchise is granted, that work on the system, which is to be operated in connection with the proposed grange lines in different counties, will be commenced at once.

GRAND RAPIDS, MICH.—Application for permission to build additional lines in Grand Rapids has been filed by the Citizens' Telephone Company.

PORT HURON, MICH.—The Independent Telephone Company of Howell, which expects to extend its system through Wayne, Lapeer, Macomb, Shiawassee, Livingston and Oakland, is soon to apply for a franchise at Port Huron.

ALMA, NEB.—The Huntley & Mild Creek Telephone Company has been granted a franchise in this city. Work has already been commenced on its office building and it expects to install a telephone system at once.

MOTT, N. D.—The Cannon Ball Telephone Company, with headquarters at Mott, has secured a right of way through Stark, Hettinger and Adam counties. It has already commenced to construct its line from Mott to Richardton, and expects to extend its system to a number of towns in the surrounding country.

NEWPORT, O.—The Fitzsimmons Telephone Company of Cincinnati, O., has applied for permission to construct telephone lines in Newport.

LE BEAU, S. D.—The Potter County Telephone Company, of which J. G. Hollingsworth is superintendent, has secured a franchise to enter this city, and construction on its system will be commenced at once. The company has already secured a number of subscribers in Le Beau, and is also building a new line between Lowry and Alaska.

ELECTIONS.

PANA, ILL.—The following officers and directors have been elected by the Christian County Telephone Company: President, Warren Penwell, of Pana; vice-president, Lee D. Hewitt, of Taylorville; secretary, Frank Brewer, of Taylorville; treasurer, C. M. Parker, of Taylorville; directors, L. D. Hewitt, Frank Brewer, C. M. Parker, J. S. Eaton, G. D. Winters, G. W. Milligan, Warren Penwell, J. M. Kuhn and D. W. Johnson.

CENTERVILLE, IND.—The following board of directors has been named by the Centerville Co-Operative Telephone Company: Isaac Spahr, John B. Pierce, Edward Hildebrand, Frank Clevenger, David Hannagan, Joseph I. Helms, John S. Stevens, Walter Burges, J. R. Spahr, John H. Jackson, Charles Miller, John W. Morgan, Charles Gower, James Harris, W. D. Cook, H. H. Peele, George Wright, Thomas Clevenger and M. A. Stevens.

GREENSBURG, IND.—At its recent meeting the Independent Telephone Company elected the following directors: Turey W. Robinson, of Westport; Walter B. Pleak, of Washington township; Charles Zoller, Jr., of Greensburg; Noah Dashiel, C. P. Miller, J. H. Christian and M. L. Miers.

MATTOON, WIS.—The officers of the newly organized Independent telephone company at this city are: J. F. Riordan, president; D. Lightbody, vice-president; Sam Kratz, secretary; B. B. Hemmingway, treasurer. Directors, J. F. Riordan, Sam Kratz, Nick Lorrig, B. B. Hemingway and D. Lightbody.

FINANCIAL.

FORT WAYNE, IND.—A semi-annual dividend of three per cent. is being paid by the Home Telephone Company of this city.

CORNETTSVILLE, KY.—The Hazard-Cornettsville Telephone Company has increased its capital stock from $4,000 to $6,000. The company expects to spend the money in improvements, and will erect a line from Hazard to Avawan, via Dwarf.

SERGENT, KY.—The capital stock of the Letcher County Home Telephone Company, recently incorporated, has been increased from $2,000 to $5,000.

SERGENT, KY.—The Sergent-Ola Telephone Company has recently increased its capital stock $500 and expects to at once commence the construction of a line to Hilliard.

BERGHOLZ, O.—The Bergholz Telephone Company has increased its capital stock from $20,000 to $40,000.

MISCELLANEOUS.

EATONTON, GA.—The Eatonton telephone system, formerly the property of R. D. Stubbs and Henry D. Spivey, has been purchased by J. G. Spivey. The plant comprises about three hundred telephones in various

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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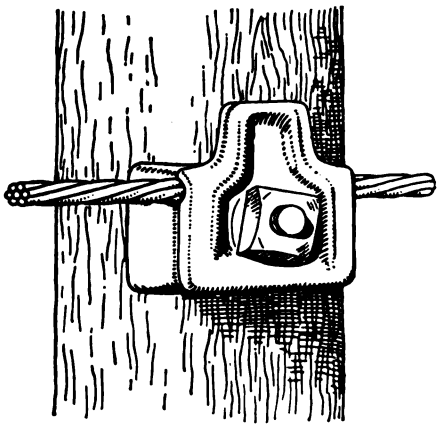

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Since our acquisition of the Bigley Telephone Co. we can insure our customers a permanent concern on which they can depend for correct goods, prompt and courteous treatment and a COMPLETE SUPPLY OF ALL PARTS which they may need.

We will not only specialize in

RE-BUILT APPARATUS

FOR TELEPHONE EXCHANGES

but will handle all supplies essential for the construction of a complete plant.

All re-built goods will be thoroughly overhauled and tested and will be guaranteed JUST AS GOOD AS NEW before leaving our hands.

WE CAN SAVE YOU MONEY

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Try us on

Rubber Covered Wire, Cable Trolleys, Telephone Signs, Telephone Cords,

and all kinds of Telephone and Switchboard Parts. We handle the celebrated "Premier BB" cord. Remember: We are here to stay and will serve you faithfully and well.

WRITE FOR OUR NEW BULLETIN NO. 7.

Premier Electric Co.

58 W. Van Buren St. CHICAGO

REDUCED PRICE

ON

IRONITE

¶ We have made a reduction in the price of IRONITE Duplex Drop Wire.

¶ It will always cost less than copper and will always be vastly superior for drop work.

¶ No. 18 B. W. G. IRONITE is a satisfactory substitute for No. 14 B. & S. Copper. The tensile strength is much greater, the insulation superior. It will not sag, stretch or break. It costs 25% less.

Durant Electric Supplies Co.

Sole Producers

52 Fifth Avenue, CHICAGO, ILL.

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News Notes That Are New

parts of the county, and it is expected that under the new management it will be greatly enlarged and improved.

GALESBURG, ILL.—The Galesburg Union Telephone Company contemplates the establishment of toll connections with the Inter-State Telephone Company. By these arrangements it will be enabled to put its subscribers in communication with Kansas City, St. Louis, a large part of the State of Missouri, Peoria, Springfield and other leading Illinois cities.

MYTON, UTAH.—Connections between the Eastern Utah Telephone Company and the Vernal Telephone Company have been established at Myton.

SOUTH BEND, WASH.—Plans have been completed for the erection of a telephone line by the government from the North Cove life saving station to the one at Westport, the money having already been appro priated.

EAST TORONTO, ONT., CAN.—At a recent meeting the agreement between the town and the Independent Telephone Company was signed. It gives the company a two year franchise, and provides five free telephones for the town with unlimited service. There is to be a free interchange of service between East Toronto and Scarboro.

SALTCOATS, SASK., CAN.—The board of trade has taken up the question of installing a municipal telephone system at this place. Address A. F. Lauder, Saltcoats, Sask., Can.

PERSONAL.

WILLIAM A. JACKSON, who has for some time held the office of president of the Michigan State Telephone Company, has recently retired. He will continue to serve the organization as chairman of the Executive Committee, to which office he has just been appointed.

W. N. McANGE, JR., of Norfolk, Va., has recently accepted the position of superintendent of the Pittston, Pa., exchange of the Consolidated Telephone Companies of Pennsylvania.

A. W. SURRELL has been appointed traffic manager of the Central Home Telephone Company, the Independent Long Distance Telephone & Telegraph Company and the Long Distance Telephone & Telegraph Company of Louisville, Ky. He will not only have charge of the operating of the exchanges of these companies, but will advise exchange companies in which they are stockholders concerning methods of keeping their service up to the highest standard.

F. O. WARREN has been appointed engineer of the Central Home Telephone Company, the Independent Long Distance Telephone & Telegraph Company and the Long Distance Telephone & Telegraph Company, of Louisville, Ky. He will not only have charge of the development work, but will also supervise the maintenance of long distance lines and central office equipment and give to connecting exchange companies, a portion of whose stock is held by the three companies he directly represents, the benefit of his experience when his advice is needed.

With the Builders

PINE BLUFF, ARK.—The Valley Telephone Company, which operates lines throughout the southeastern part of Arkansas, has recently established connections between this city and Fordyce.

BERKELEY, CAL.—Work on the construction of its new exchange building is being carried on by the Home Telephone Company.

CARBONDALE, COLO.—Acting Supervisor John MacLaren, on the Hold Cross national forest in Colorado, has been authorized to expend $2,200 for the construction of a telephone line from Carbondale to Norrie, by way of Basalt.

ROCKFORD, ILL.—The Home Telephone Company of this city is planning to double its present capacity. New cables are to be strung in every part of the city, and the system improved in every possible way. These extensions have been made necessary by the increase in the company's business.

PEORIA, ILL.—Work on the construction of its new lines between Peoria and Canton is being carried on rapidly by the Inter-State Telephone and Telegraph Company and connections will soon be established between Canton, Farmington, Brereton, Norris, St. David and other points.

CROWN POINT, IND.—To take care of its rapidly increasing business in this city the Crown Point Telephone Company expects to install a new up-to-date switchboard, and to make many other improvements in its plant.

MARENGO, IA.—It is estimated that about $2,000 will be spent by the Marengo Telephone Company in the improvement of its system in this city.

SIOUX CITY, IA.—It is expected that over twenty thousand dollars will be spent by the Sioux City Telephone Company within the next thirty days in the improvement of its system at this point.

EMDEN, ILL.—The Bethel Telephone Company's plans for improving its service include the rebuilding of its system at Emden.

TOPEKA, KAN.—Preparations are being made by the Santa Fe Railroad Company for the construction of a long distance telephone line connecting the general offices at Topeka with the offices at Newton. This line, which it is estimated will cover a distance of 135 miles, is to be used exclusively by the railroad company. It now has a similar line in operation between Topeka and Kansas City, and plans, in due time, to have a continuous service from one end of its system to the other.

COLSON, KY.—A seven mile telephone line from Colson to Ison is to be constructed by J. M. Brown, whose intention is to form connections to the latter city with the Rockhouse Telephone Company.

HINDMAN, KY.—The Carrs Fork Telephone Company is planning for the erection of a twenty-five mile extension from Hindman, via Lackey, to Vest, Ky.

MADISONVILLE, KY.—The Louisville and Nashville R. R. Company is installing a telephone system on the Henderson Division of its line. It already has a telephone system in operation between Evansville, Ind., and Guthrie, Ky., and is considering the advisability of extending it to Nashville.

CADILLAC, MICH.—Many improvements in its system are being made by the Citizens' Telephone Company in this city, which include the stringing of a considerable amount of new cable. A new copper toll line is to be erected between Cadillac and Manton, and another one between Lake City and McBain.

PALO, MICH.—The Palo Telephone Company has secured a sufficient number of subscribers at Hubbardston to warrant it in establishing an exchange at that place, and work on it has already been commenced.

GOOD THUNDER, MINN.—Many improvements and extenisons in its system at Good Thunder are being made by the Citizens' Telephone Company.

WILLOW SPRING, MO.—The Willow Spring Local & Long Distance Telephone Company has commenced the construction of its lines to Seymour and Springfield. This company, which was organized some little time ago, expects to establish a thoroughly modern telephone system in Willow Spring and the surrounding country.

GREAT FALLS, MONT.—The Independent Telephone Company, of Butte, is planning to establish an exchange in Great Falls during the coming winter. Its exchange at Anaconda is practically completed, and it is expected that systems at Helena and Great Falls will be installed at the same time.

MULLEN, NEB.—A telephone line north of Mullen is to be constructed by J. L. Rosenberry, who has already built other rural lines in the vicinity of that city.

TRUXTON, N. Y.—Among the improvements being considered by the Truxton and Chenango Telephone Company are the rebuilding of its lines and the construction of a new line to take care of the new subscribers it has recently secured.

JERMYN, PA.—The Chapman Lake Telephone Company is constructing a new line to Brown Hollow and Tompkinsville by way of Lake Chapman.

PIERRE, S. D.—The lines of the Great Western Telephone Company are being extended west of the Missouri river. Construction work on a line northwest from Pierre to reach out into the Cheyenne river country has been commenced, and it is expected that ultimately the company's lines will completely cover the country west of the Missouri river as far out as the Black Hills.

BRISTOL, TENN.—Among the many improvements planned by the Bristol Telephone Company is the reconstruction of its lines between this city and Blountville.

BEEVILLE, TEXAS.—The Eureka Telephone Company, which has recently increased the capacity of its exchange at this city, intends to completely overhaul its plant, and make it up to date in every particular.

SEMINOLE, TEXAS.—The lines of the Seminole Telephone Company are being extended from this city to Plains, the county seat of Yoakum county, and other extensions are being considered.

BELLINGHAM, WASH.—It is the intention of the Farmers' Mutual Telephone Company to construct a new line between Bellingham and Blaine, and to make many other improvements in its system.

VEGREVILLE, ALB., CAN.—The government telephone line to this town is practically completed. When this work is finished about five hundred government-owned lines will be in operation in Alberta.

AYLMER, ONT., CAN.—The Rural Telephone Company, of East Elgin, which has a central exchange at Aylmer, is extending its lines in many directions.

UNDERGROUND.

ASHTABULA, O.—Considerable additional conduit work is being planned for by the Ashtabula Telephone Company at this city.

YORK, PA.—A great number of its wires are being placed underground by the York Telephone Company in the business portion of the city.

LINDSAY, ONT., CAN.—Work on its conduit system in this city is soon to be commenced by the Automatic Telephone Company.

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The American Telephone Journal

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VOLUME XVI. SATURDAY, NOVEMBER 16, 1907. NUMBER 20.

Rules for Operating Room Employees

A Complete Set of Instructions and Rules for the Government of Local Operating Room Employees.

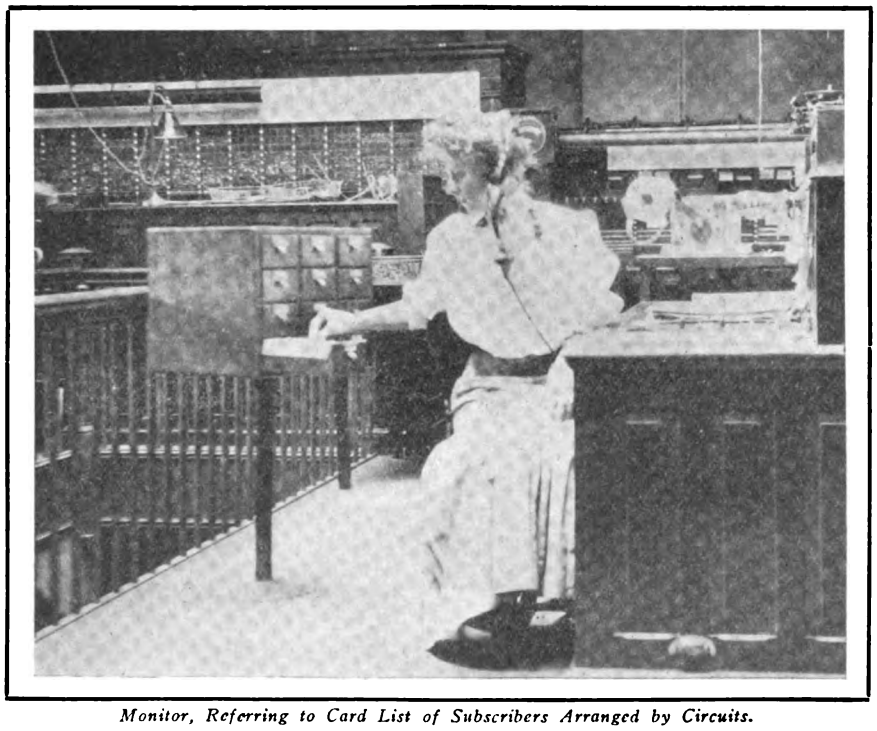
COMPILED BY KENDALL WEISIGER.

Illustrations from special photographs by John Putnam.

THESE rules and instructions are designed for the government of local operating room employees and it has been the intention to cover the more important items of discipline and such operating methods as will be applicable in offices of all kinds and sizes. On account of variation in the size of switchboards, party line systems, trunk circuits, etc., it will, of course, be found that certain of the instructions will not be applicable in some particular office. It will also be found that instructions covering the use of ringing keys have been merely outlined, as such instructions would not be capable of general application to practice.

The organization as outlined is arranged to suit the office of average size, but it may be condensed to suit smaller offices when the chief operator would act as chief supervisor, supervisor, monitor and clerk. To indicate the relation of the various members of the force, organization charts of a single office district and a multi-office district are shown.

The chart for the single office district shows the chief operator reporting directly to the exchange manager. The chief supervisor has charge of the operating force, both local and toll, and reports to the chief operator. The operator in charge at night is called the night supervisor and not night chief operator, as is the common practice; this is done for the reason that the night supervisor is simply in charge of the office during a light period and she has no authority except as the working head of the small night force. The chief operator may be a male, but the chief supervisor is always a female.



Monitor, Referring to Card List of Subscribers Arranged by Circuits.

The chart for the multi-office district is arranged to suit one large office, operating several smaller offices or tributaries. The toll office is in the same building and is large enough for its own organization. In a multi-office district operating several large offices the chart would be a combination of single office district, all reporting to a traffic manager who in turn reports to the exchange manager.

In arranging these charts the writer has thought of the operating organization as analogous to the army organization. The operators are the privates, the senior operator is the corporal, working in the ranks, but in line for promotion to supervisor who corresponds to the sergeant. As sergeants report to the first or orderly sergeant, so the supervisor reports to the chief supervisor, who in turn reports to the chief operator or the captain. A single office district may be said to represent a single company.

A multi-office district comprising several large offices may be taken to represent a battalion, the captains or chief operators reporting to the major or traffic manager.

In the case of a multi-office district comprising one large office and several smaller offices, the small offices would be treated not as companies, but as squads under a sergeant or supervisor in charge.

¶*Organization.*—It is not the intention to set forth in these instructions the duties of the executive force in detail, but simply to cover their functions in a general way, so that each employee affected by the instructions may get an idea of the organization and a general idea of the duties of the various members of the force.

DUTIES OF THE CHIEF OPERATOR.

Responsibility.—The chief operator is responsible to the man-

EDITOR'S NOTE.—This is an actual set of working instructions for a traffic department. Supplementary notes inserted for the information of telephone men who are not operating experts, or to explain doubtful points, but not properly included in the actual working copy, are contained in paragraphs preceded by the sign (¶).

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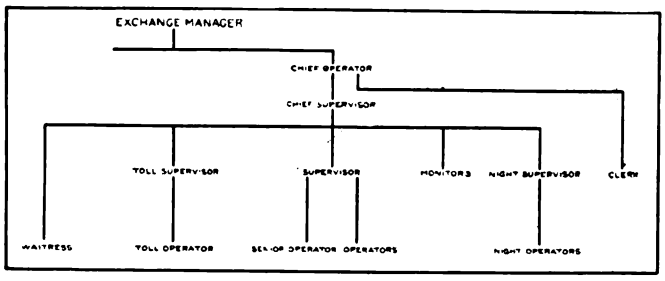
ager for the proper discipline and efficiency of the operating force, and for the quality of the service rendered to the subscribers. He will see that his subordinates carry out all instructions, and will make such arrangements and recommendations as may be



Typical Organization of Operating Department in Single Office District.

necessary to provide at all times a competent operating force and adequate facilities for the proper handling of the traffic.

Authority.—The chief operator is authorized to expel from the operating room any employee of any department or any one who may in any way interfere with the discipline of the operating room.

¶ Entire responsibility for the quality of the service being placed upon the chief operator, he should be invested with the authority to expel from the room any one who may in any way interefere with the discipline of the room. Maintenance men, installers and others when working on the switchboard often attempt to indulge in conversation with the operators. In some instances, noises incident to installation and maintenance work must be stopped and the work discontinued during the day. Such matters require immediate action, hence it is essential that the chief operator have full authority in dealing summarily with persons who cause disturbances.

The chief operator has full authority in the matter of employing or dismissing subordinates, and in varying their salaries within the limits of the authorized amounts. Recommendations for pay-roll changes, and for additions to the force, should be made to the manager, as occasion may demand. It is the duty of the chief operator to secure, by advertising or otherwise, a sufficient number of student operators to maintain the size of the authorized operating force.

Supervisor Assisting Subscribers' Operator by Taking Down Connection.

¶In districts large enough to warrant the maintenance of a school for operators the chief operator will be relieved of this duty as the school may be drawn on from time to time as occasion may demand. In many offices the matter of securing and keeping desirable employees occupies a large part of the time of the chief operator.

¶ Many plans of securing help have been tried from time to time with varying success. Newspaper advertisements draw a large number of applicants, but even this method has been known to fail. In some instances the aid of school authorities and ministers has been sought with the idea of reaching a class of girls who might make desirable operators. Some companies have prepared interesting booklets, setting forth the desirability of becoming telephone operators. One method of placing such literature in the hands of prospective employees, has been to secure lists of the female graduating classes and to so arrange that it would be placed in their hands on the morning after the graduating exercises. In placing newspaper advertisements care is necessarily used in selecting the medium to secure the one which reaches the class of people from which the prospects are to be drawn.

Records and Reports.—It shall be the duty of the chief operator to see that all prescribed records are neatly and correctly kept, and that all current reports are sent out on the prescribed date.

Safety of Operating Force.—The chief operator will be held responsible for the safety of the operating force in case of fire, and must see that all employees understand the fire drill, and that they thoroughly understand the use and location of fire protective apparatus, and all means of escape.

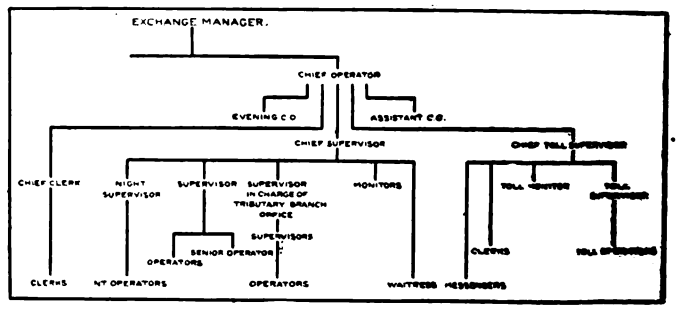
¶ The advantages of fire drills are so apparent that the system has been adopted in a considerable number of offices. The idea is to quickly vacate the operating room in an orderly manner and to so maintain the discipline that the force may be as quickly returned to the room as soon as the danger is over. By a system of signals given on a large gong the operators push back their chairs, remove their telephone set plugs, and file out of the operating room. Each supervisor falls in behind her section and the chief operator brings up the rear. The line may be marched into the locker room and back again, either through the same door or else by completing a circuit and entering by another door. All connections should be left exactly as they are at the first sound of the gong, the work being resumed at the last sound of the gong. The whole cycle may be performed in less than two or three minutes. This short interruption to the service can be easily explained to complaining subscribers, the most unreasonable of whom would be satisfied with the explanation.

¶ The maintenance force should be assigned to certain duties, such as pulling down the waterproof cover, where one is used, bringing sand buckets, etc., each member being assigned a certain duty, along the general lines laid out on shipboard.

Accidents to Employees.—In case of an accident, of any kind, to any employee of the operating department, it shall be the duty of the chief operator to immediately notify the manager.

DUTIES OF THE CHIEF SUPERVISOR.

Responsibility.—The chief supervisor is responsible to the chief operator for the conduct and discipline of the supervisors, monitors and operators, and for the quality of the service rendered by them. She will equalize the forces under her various supervisors, making such arrangements and transfers as may be necessary to produce the highest efficiency. She will also see that the organization of the various supervisors' divisions is maintained,



Typical Organization for an Operating Department in a Multi-office District.

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and that the senior operator of each division takes the place of the supervisor in the absence of the latter.

Inspection of the Quarters.—The chief supervisor is held responsible for the conditions and cleanliness of the quarters occupied by the operating department, and will make a daily inspection of them. Especial attention will be paid to operators' lockers, to see that they are kept free from all discarded clothing, papers, books, etc.

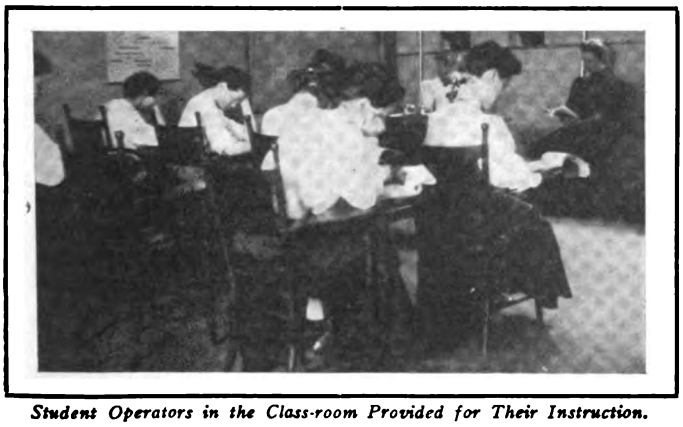
Examination of Applicants.—In offices where operators are not furnished from a training school, the chief supervisor will examine all applicants, and in a general way supervise their course of instruction.

¶ As training schools for student operators are justifiable in the larger offices only, it is necessary for other offices to have some well defined course of instruction. It is generally the custom to designate one or more of the older operators to instruct the students at the switchboard. If this course is followed the instructress should have a well defined plan in order that the various instructions may be taken up in such sequence as is calculated to produce the best results. It is not a difficult matter to frame a course of instruction from existing rules; care should be taken to simplify the wording and to arrange, if possible, memory schemes whereby the student may remember the instructions with the least mental effort. Small classes of students can be given theoretical instruction in the retiring room previous to the practical application of the instruction at the switchboard.

Pay-Roll.—It will be the duty of the chief supervisor to carefully examine the pay-roll, as made out by the chief clerk, and to verify its correctness.

DUTIES OF A SUPERVISOR.

Responsibility.—The supervisor is responsible to the chief



Student Operators in the Class-room Provided for Their Instruction.

supervisor for the conduct and discipline of the operators in her division, and for the service rendered by them in accordance with the rules drawn up for their guidance. She will give any needed assistance and instruction to these operators, and will make such assignments of operators to positions in her division as may be necessary to produce the best general result.

¶ Each supervisor being responsible, for her section, she should have full latitude in arranging her squad to meet the requirements of the load as it varies from hour to hour during the day. Care should be taken not to work students or younger operators in positions where they will be adjacent to each other or at an end position. The less experienced operators should be judiciously placed in light positions, with more experienced operators on each side.

Irregularities in the Service.—The supervisor will make investigations of irregularities in the service that are brought to her attention, in order to locate the operator or operators at fault, and will report the results of her investigations to the chief supervisor for such action as may be necessary.

DUTIES OF A MONITOR.

Monitor Operators are detailed on the very important work of handling irregular calls, giving information to subscribers and operators, receiving complaints and other special duties which may be assigned to them from time to time. They will answer calls in a bright business-like manner, bearing in mind the fact that subscribers often base their opinion of the service on the manner in which irregular calls are handled by the desk operator.

Monitors must, therefore, be quick, accurate, and above all, courteous to subscribers, giving them prescribed information in the prescribed way, assuring them that their complaints will receive careful attention, etc.

¶ Monitors on complaint desks are sometimes prone to make promises to subscribers as to the time when trouble will be attended to. While this may be done with the best of intentions it may be the means of causing the company to make embarrassing explanations. The monitors should, therefore, receive the complaint with as few words as possible and if necessary assuring the subscriber that his complaint will receive careful attention, at the same time being careful not to make definite time limits on work over which they have no control and of which they have little knowledge.

DUTIES OF THE CLERK.

The clerk is responsible for the proper keeping of all operating room records, operator's time, for making out the pay-rolls, for making out all routine reports, and for any other work of a clerical nature which may be necessary.

It will also be the duty of the clerk to execute all line orders, and to see that the maintenance force makes such changes on the face of the switchboard as may be required by the line orders.

DUTIES OF SENIOR OPERATORS.

A senior operator takes the place of the Supervisor in the absence of the latter.

¶ Some companies divide operators into two classes, junior operators and senior operators, depending upon their experience and length of time in the service. In these instructions, however, a senior operator is considered to be an experienced operator who has shown by her work that she possesses qualities which will fit her to become a supervisor. She may therefore be considered as an understudy for the supervisor.

(To be continued.)

EXTENSION OF TELEPHONIC COMMUNICATION IN THE SOUTHWEST.

THE building of Independent telephone lines into remote parts of New Mexico has made wonderful progress during the last year. The Silver City-El Paso and Southwest Telephone Company is constructing a system of long distance lines which will give outside connection to El Paso, Las Cruces, Rincon, Engle, Los Palomas, Silver City, Deming and intervening towns. This company has just purchased the telephone line which runs between Las Cruces and El Paso from the Texas & New Mexico Telephone Company. The acquired line will be merged into the general system which the company is building. The Silver City-El Paso and Southwest Telephone Company has a capital stock of $100,000. It has planned to extend its lines to all of the principal towns and cities of New Mexico and Arizona. Among the men interested in the company are John H. Morgan, of El Paso, who is manager of the Southwestern Independent Telephone Company of that place; W. E. Baker, of Las Cruces; William D. Murray, president of the Silver City Telephone Company, and C. B. Bosworth, of Deming, N. M.

A PROSPEROUS TELEPHONE SYSTEM IN ALASKA.

THE Alaska Telephone & Telegraph Company, with headquarters at Nome, Alaska, has developed a very good system of telephone lines and exchanges in the country in the far north. Mr. A. E. Boyd, who is responsible for the organization and progress of this company, started in a small way by building a line from Nome to Solomon and later extending it to Council. He purchased the system operating in Nome, then owned by the Wild Goose Company, and organized the Alaska Telephone & Telegraph Company, merging all his holdings into that one organization. He has to-day over 1,500 miles of line

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Loose-Leaf Cable Records

By Wm. Geckler, Jr.

RECORD sheets for a subway cable distributing system may, advantageously, be so designed as to permit of their being kept in a loose leaf binder of one of the several satisfactory types on the market. In such a system a map indicating the dimensions, location, and relation to one another of the various physical parts of the system, is the fundamental record. In Fig. 1 is suggested a method of keeping track of cable locations on a map section. These maps are made in numerical series for each street in which subway is laid, 12 inches wide and 30 inches long, scaled 30 feet per inch, or 36 inches long on a 25-foot per inch scale. A 2-inch margin, provided on the left of each sheet, serves for binder space. It will be noticed that each street has a different series of numbers; also that each series of numbers is in numerical progression away from the central office building. Where there is more than one exchange, either the "main" exchange or the intersection of two principal streets may be chosen as the hub for the numbering system. In mapping the system, the manholes and duct sections are drawn as near to their relative locations in the street as possible, and all necessary data relating to conditions and dimensions are shown. The figures in brackets shown in the subway sections indicate subway section lengths and are given in feet with decimal fractions to the nearest hundredth. The numerical quantity above the line indicates the length of a single duct in the section from face to face of manholes, while that below the line indicates the length of subway section from center to center of manhole covers. When there are two covers on a manhole, the cover near the hub of the system is taken as the measuring point. Tile duct is represented by light dotted lines while iron pipe is represented by light solid lines. Such portions of subway appearing on the map, but of another numerical series are shown by a light ink-wash line. The figure in the upper right-hand corner represents that the map shown is the first map of that numerical series, while the figures on the extreme right are the number of the map which follows. The figures in the intersecting streets show that the first map of each particular series begins at that point. The figures shown over the subway section at the right, at each side of the ward boundary line, indicate the feet of subway of that section contained in each ward.

In numbering the ducts according to the system adopted for this record, number one duct will be the lower duct nearest to the curb which parallels the subway. Numbers run horizontally across the lower ducts toward the center of the street then beginning again with the next upper duct nearest the curb and numbering as from number one duct in numerical order until all ducts are numbered. When a portion of subway crosses the street as shown from M. H. 104 to M. H. 104-A., the M. H. as well as the section is given a sub-letter with the number of its next preceding M. H. and section. The lower duct nearest the hub is considered as number one duct, also, if the subway changes its course from one side of the street to the other, no matter at what angle the section crosses. All sections of subway between regular manholes, that is, those into which the full number of ducts in the subway enter are termed regular sections. Those sections between a regular manhole and a sub-manhole or between two sub-manholes are termed sub-sections, while those between a regular manhole and a pole, or between a sub-manhole and a pole are termed laterals or pole ends. There are two kinds of sub-manholes, one being a manhole cut between two regular manholes in a section and taking only a portion of the regular subway, usually the upper course of ducts and the other a smaller and lighter manhole, more like a handhole, used to facilitate cable distribution and always placed inside of the curb line on account of its inability to stand traffic. This is sometimes termed a baby manhole.

In Fig. 2 is shown a cable record sheet upon which the distribution of each cable is recorded. The distribution of a cable is recorded from the main exchange to the limit of map number one, or to be more precise, to the next manhole, which would appear on map 1.02. Referring to the upper portion of col. 1, sheet No. 18, indicates that it is the 18th sheet under cover. Record No. 1 indicates that this cable is undisturbed since its original installation, while the date indicates the time when the record was completed. If for any cause the original distribution of the cable is altered, a new record is written and No. 2 is placed as the record number and record No. 1 is filed numerically, according to cable numbers in a binder containing obsolete records only. Under the heading "Summary by city wards," the number of feet of the different size cables (appearing on the lower portion of the sheet) are distributed into their respective headings and wards.

Under "Ward Totals" the actual number of feet of cable contained in each ward is recorded. This figure gives a summary of the various lengths appearing in that ward under the different cable sizes. The total footing represents the total cable feet contained in that particular cable. When more than one sheet is required for recording a cable distribution, the summary of all the sheets is recorded on the first sheet of that particular cable. Under "Cable points," data relating thereto are recorded. Under "Branches and pole ends" is recorded the number of pairs of each branch, the manhole from which the branch is taken, and also the length of each section of a particular branch. Consequently the summary of the regular subway and that of the branches. Pole ends would equal the total by wards of each

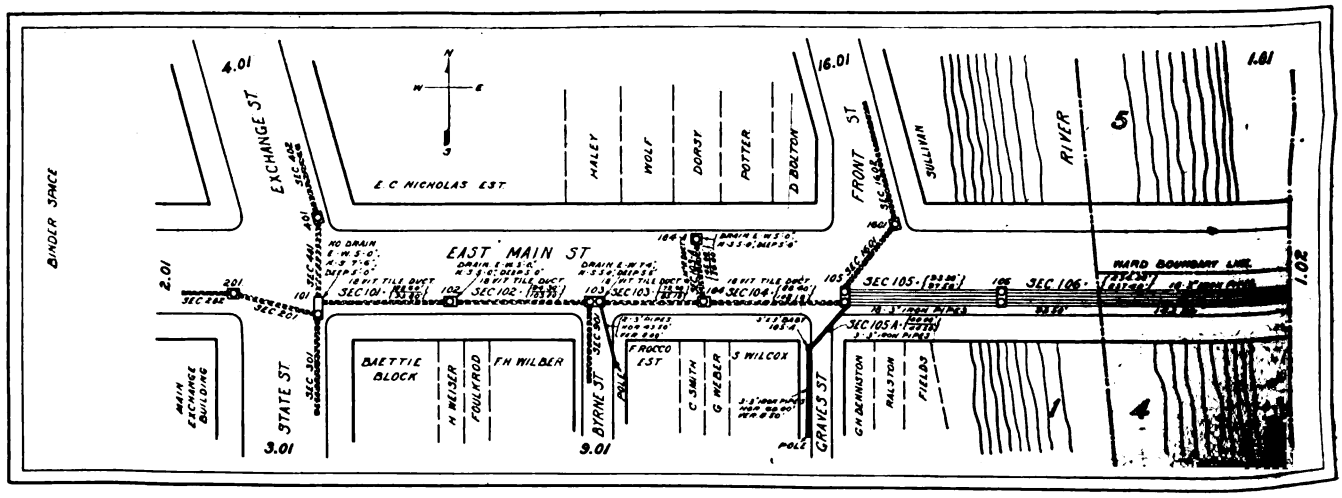

Fig. 1. Map of a typical city district, showing method of recording distribution of cable in subways.

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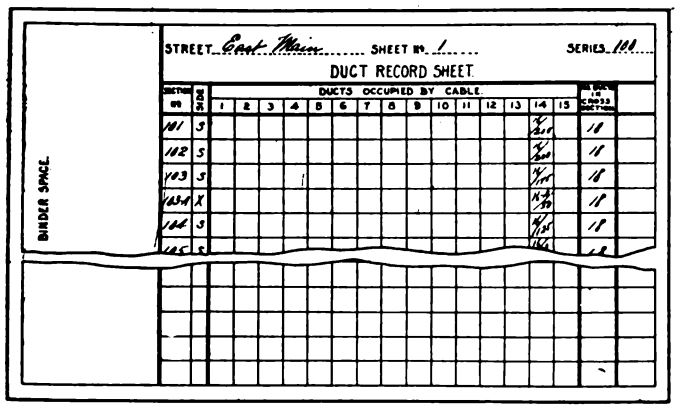
comparing the figures with those appearing on the subway map (Fig. 1) its use will be readily understood. The headings "Merged cable" and "Merged with cable," are provided because it sometimes occurs that two small cables parallel each other in the subway, but occupy different ducts. Economy is shown by cutting them together or merging them into one cable of larger capacity.

One may more clearly describe the method of recording merged cable as follows: Assume that cable 16 continues in the subway until M. H. 112 is reached, where another 50 pair lateral is dropped off, which would have 50 pair remaining of No. 16 cable. Again assume that another cable, say No. 12, paralleled cable 16 and it occurred that 50 pair of 12 remained at M. H. 112, and both cables are to continue in the subway. Cable 16 might then


STREET Cent. Main SHEET No. 1 SERIES 101

DUCT RECORD SHEET

DUCTS OCCUPIED BY CABLE

BINDER SPACE

Fig. 3. Form for duct record sheet, which may be about 8½ x 11 inches in size.

be merged with cable 12 in a 100-pair cable and continued in one duct. The disposal of the remaining 50 pair is recorded as shown in Fig. 2, and its distribution would be recorded with the cable record of cable No. 12.

The sheet shown in Fig 2 is 12 x 17 inches in size. In Fig. 3 is shown a "Duct record," sheet 8½ x 11 inches in size. This sheet is used for recording the duct occupied by cable in each section of a particular series. The sheets are numbered in numerical order from one up to as many sheets as are required in the series of sections on any street. When there are more than 15 ducts in cross-section in any section, a sheet containing the remaining duct numbers is placed immediately following each sheet, with a sub-letter added to the preceding sheet number. The duct numbers may be corrected in red ink to read consecutively with those of the first sheet. These sheets are required where it is desired to ascertain what cable occupies a particular duct in a certain subway section. As the series numbers are placed in numerical order only a moment is required to obtain the necessary information. A portion of cable 16 is recorded in its respective sections and ducts.

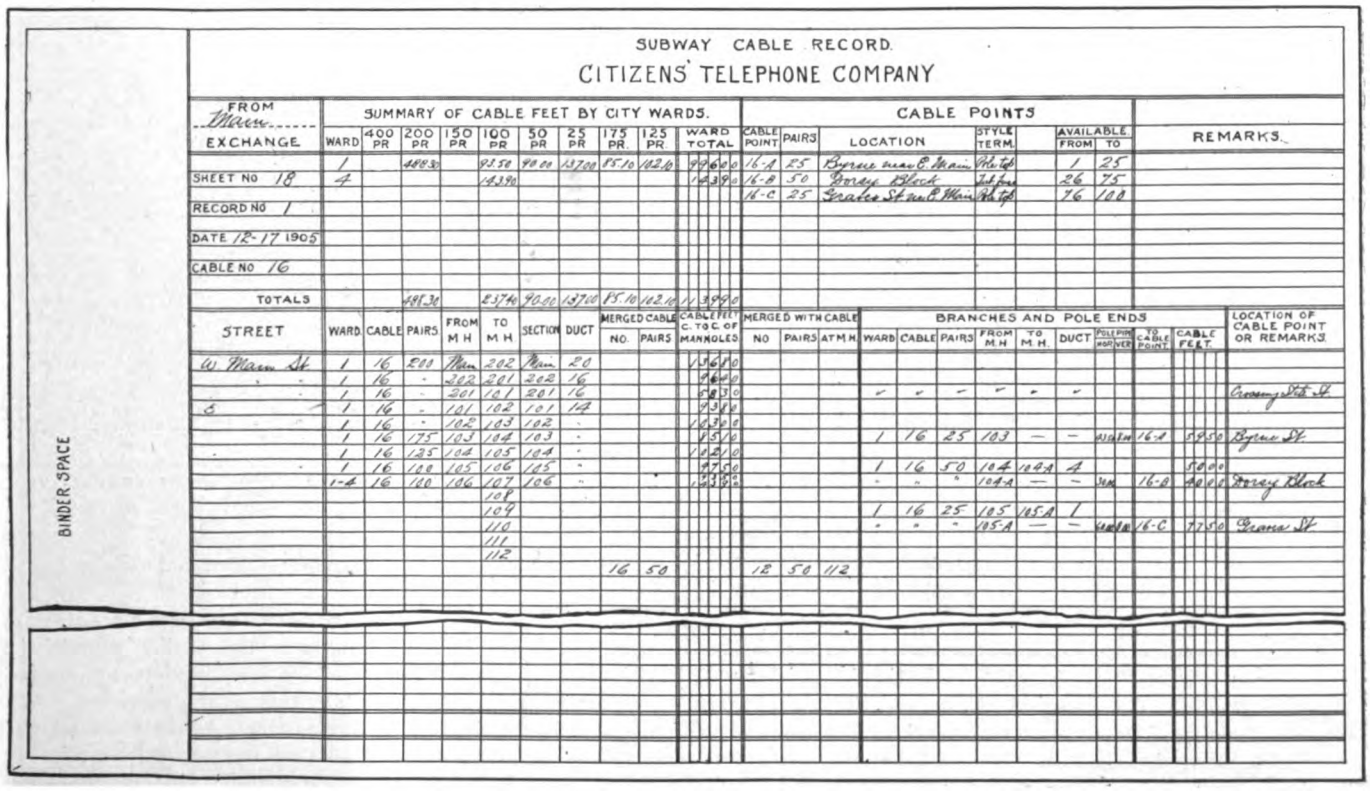
NEBRASKA TELEPHONE ASSOCIATION TO HOLD CONVENTION AT LINCOLN IN JANUARY.

JANUARY 15th, 16th and 17th, 1908, will be the dates set for the next convention of the Nebraska Independent Telephone Association. The delegates will meet at the Lindell Hotel in Lincoln. Representatives from adjoining states have already promised to attend this convention, and it is expected that all of the leading Independent telephone men of Nebraska will be on hand. During the past year the association has been very successful in its work, and every one is looking forward to an exceptionally enthusiastic and useful meeting.

PEOPLE OF SPENCERPORT, N. Y., WANT INDEPENDENT CONNECTIONS NOW THAT THE BELL COMPANY HAS RAISED ITS RATES.

A FEW years ago an Independent telephone company wished to establish an exchange to compete with the Bell company in Spencerport, N. Y. As soon as the proposition was made the agents of the company already established went to work vigorously on their usual "educational" campaign intended to convince people that it would not be to their advantage to have two telephone systems. Apparently their work was successful but, in order to clinch the matter, it is reported that they found it necessary to promise that they would never raise rates.

As the rate for residence telephones is only $12.00 per year, and there are about three hundred of these instruments, in addition to 25 business telephones at $24.00 a year, the company at the present time finds itself in a position where it is desirable to raise rates. It proposes to put the charges for residence telephone at $18.00 a year, and this projected raise is meeting strong opposition. Telephone subscribers say that a 50 per cent. in-


SUBWAY CABLE RECORD

CITIZENS' TELEPHONE COMPANY

FROM Main EXCHANGE

SHEET NO 18

RECORD NO 1

DATE 12-17 1905

CABLE NO 16

BINDER SPACE

Fig. 2. Cable record sheet, giving data to correspond with map on opposite page.

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crease is altogether too much, and that rather than pay the charge over two-thirds of the telephone users will have their instruments taken out, and invite an Independent company to operate in the town.

The Telephone in a New Branch of Department Store Economy

A Suggestion to the Telephone Contract Agent for an Interesting Line of By-Products—Isolated Equipment Service

By J. F. Brown.

DEPARTMENT stores which depend upon credit customers for a large percentage of their business must necessarily employ methods which are prompt and efficient. Many valuable patrons have been annoyed—or even lost—by having

Fig. 1. Counter in department store equipped with new electrical credit system.

been compelled to wait for their purchases until the charge slips had been approved by the credit clerk.

To avoid this delay an "electrical credit system," making use of the telephone, has been invented and placed upon the market by the National Cash Register Company to be used in connection with its "400 department stores register system." By the use of this system power to O. K. charge sales is in the credit office, but the sales slips do not leave the department until the close of the day's business.

At each station is placed a specially designed cash register from which change is made for customers and records made of every sale. In addition to the register there is a telephone equipped with an electrical stamp. This stamp contains printing wheels, which at the pressure of a button in the credit office

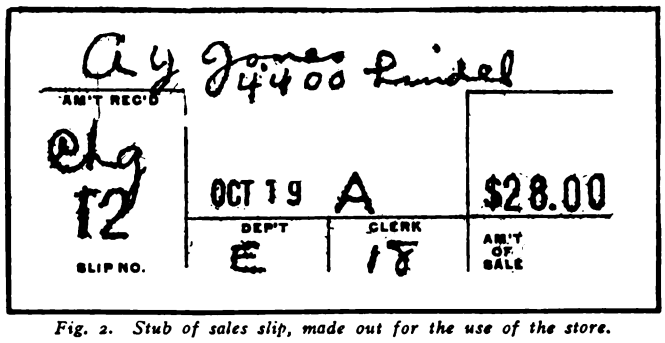

Fig. 2. Stub of sales slip, made out for the use of the store.

indelibly print the date, station number and the word "charge" on the sales slip. Underneath the stamp there is a slot and shelf where the sales slip is placed. A small generating set connected to the lighting circuit furnishes power for stamp and telephone and consumes only as much power as two 16-candle power incandescent lights.

The telephone is used by the cashier inspector at each station to communicate with the credit office, where the central station, very much like a small telephone switchboard, is located.

To summon the credit clerk the cashier inspector has only to move the receiver hook, which action lights a lamp and rings a bell at the switchboard. When the central office is ready to answer a connection is made with the regular telephone switchboard. Each station has an individual signal in the credit office, and a buzzer summons the inspector when the credit clerk is ready to talk. The inspector then gives the customer's name and the amount of the charge, and hanging up the receiver, attends to other work. The credit clerk looks up the account, and if he approves the charge, presses the button which stamps the sales slip and at the same time calls the inspector. In case the inspector has neglected to insert the sales slip in the slot a bell rings inside the switchboard and the credit clerk calls the delinquent with the buzzer. The stamped slip, which gives the cashier inspector authority to deliver the goods, is placed in a drawer of the register and the duplicate given the customer with the package.

At the end of the day the original slips, bearing the O. K.

Fig. 3. Desk in credit office from which charges on sales slips are authorized over the telephone.

stamp, are collected from the cashier inspector's desks and taken to the credit office. Here they are verified and sent to the ledger clerk.

That this system is a distinct advantage over the authorization of charge sales by floor walkers or the sending of slips to the credit office cannot be denied. Tubes, carriers or messengers cannot possible consume as little time as the telephone. Another feature is the elasticity of the system. As the store grows new stations may be established with the register and electrical credit attachment installed at small expense. Also the expense for

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motive power which is necessary when pneumatic tubes or carriers are used is saved. This is an interesting example of the application of telephone service to a limited special line on account of its evident superiority over other means of communication.

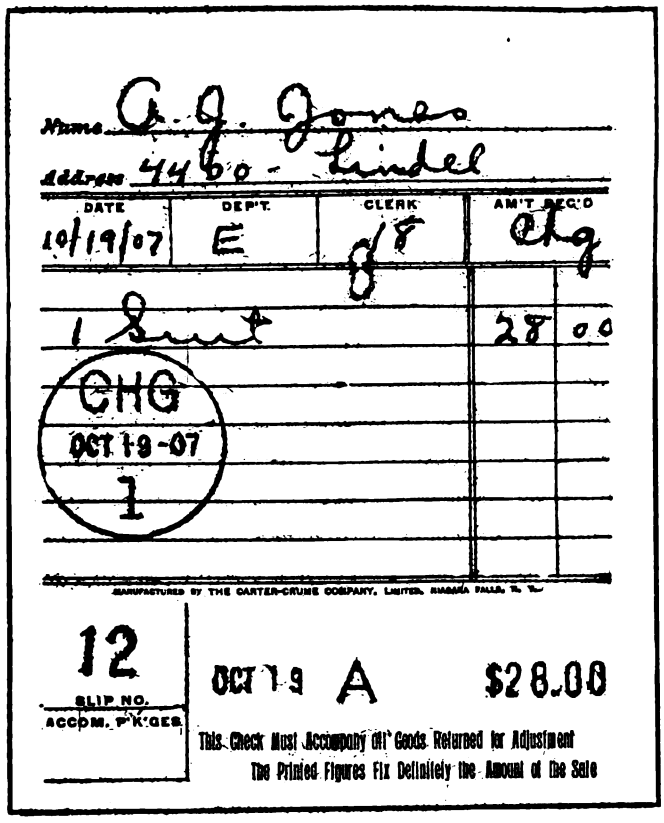

Fig. 4. Sample sales slip with charge stamped in indelible ink without the paper ever having been seen by the credit clerk.

INDEPENDENT FRANCHISE AT DALLAS, TEXAS, TO BE PUT TO PUBLIC VOTE.

THE petition of E. L. Swaine and Frank J. Norris for a franchise to construct and operate a telephone system in the city of Dallas, Texas, has met with favorable consideration by the citizens generally and there seems to be no question that when the matter is put to public vote it will readily carry.

Fig. 5. Inspector's desk, equipped with telephone and cash register for electrical credit system.

At each session of the Municipal Commission recently, communications have been received from citizens of adjacent cities asking that the city authorities allow the installation of an Independent telephone system as they are using the Independent system, are satisfied with it and desire connection with Dallas over Independent lines. If this question is submitted to the Dallas voters, it will be the first exercise of this prerogative granted in the city's organic law, as it was conferred by the Thirtieth legislature of Texas recently assembled.

GOOD COPY FOR TELEPHONE COMPANIES TO FURNISH THE NEWSPAPERS.

INDEPENDENT telephone companies are being furnished by the International Association some interesting matter for distribution among the newspapers. Short articles are sent out on receipt of applications. Two of them are worded as follows:

"Telephone companies sell nothing but service. The plant is left intact after use from time to time. It is not like a stock of merchandise that is decreased with an active trade. The plant of a good telephone company grows in value with the increase of population and nothing sold that detracts from the plant. Service is rendered and charged for. All that is necessary is to perform it satisfactorily. One thousand dollars per month income from rentals is about on a par with a merchant selling goods sufficient to make that amount in gross profit."

"*Reasons for the Advent of the Independent Telephone.*—The primary reason for the existence of the Independent telephone movement is that there was at its inception, and is to-day, a great unfilled demand for telephone service. The old company with its hundreds of millions of capital was unable to take care of the growth at the time the Independent movement started, and to-day after thirty years of development the combined interests of the Independent and Bell are not able to take care of the pressing demand for telephone service.

"As an evidence that this is a true reason for the establishment and existence of this stupendous movement is the fact that mutual companies are springing up in various localities, for the same reason that the Independents were started, namely, to fill to-day, as then, an unsupplied demand for telephone service. Wherever there is a community of a few hundred people, there is found a demand for telephone service, generally for the service that will put them in touch with the nearby towns. If these towns are supplied with Independent telephones, then such communities wish service with the Independents; if not, with the Bell. But if they cannot get service and connection with either, then they proceed to supply themselves by forming mutual companies, not for profit, but for local service, and finally get connection with the larger towns in various ways."

Wherever possible managers of Independent companies will do well to hand these over to the local newspapers for publication, and send marked copies of issues in which they appear to the headquarters of the association.

CALIFORNIA INDEPENDENT COMPANY ELECTS NEW OFFICERS.

AT Los Angeles, Cal., the Union Home Tel. & Tel. Company has elected Frank W. Wachter president to succeed Col. J. M. C. Marble, who has recently resigned to devote more time to his other interests. Mr. Wachter also holds at present the position of president of the United States Long Distance Tel. & Tel., of Los Angeles, and general manager of the Empire Construction Company, which is constructing the new Independent plants in San Francisco and Oakland, Cal. Mr. C. H. Temple, manager of the Long Distance Company, was elected engineer, and Mr. James Baldwin was appointed secretary of the Union Home Company. Although the headquarters of the Union Home Company will be removed to the building containing the Long Distance Company's offices, the officials deny that there is any immediate possibility of a consolidation of the two systems. The two companies mentioned are not connected in any way with the Los Angeles Home Tel. & Tel. Company. The Union Home Company owns exchanges in San Bernardino, Highlands, Colton, Santa Ana, Fullerton, Anaheim, Long Beach, San Pedro and Ventura.

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As Things Look to the Editor

WHEN TO PAY THE PRICE OF GOOD MATERIAL.

IN some localities it is not at all unusual to find that the man who has the handling of the local telephone system is more heavily interested in some other business. The telephone may be a side line, taken up, as likely as not, simply because the community needed service and it fell to the lot of some one of those who wanted it to push the matter. A man who finds himself in the telephone business in a small way, largely by force of circumstances which he has not foreseen, can hardly be expected to take such an interest in it as to make it his exclusive study. It would scarcely pay a farmer, for example, to leave the handling of his crops to outsiders while he studied the theory of cross-talk. But the man who is operating a telephone system does need a certain amount of technical knowledge, even though his lines may be few in number and of the simplest type. It is too bad that more builders of rural lines do not know when they start a search for telephone apparatus and equipment the real difference between what is good and that which will never stand the test of practical use. Those who have been through the whole experience of a first purchase of unsatisfactory goods, and the replacement of it after a disastrous trial, freely admit that whatever loss was incurred came to them because they did not understand the language of the business. The kind of knowledge the newcomer in the telephone business needs is that which will enable him to determine quickly whether or not the parts of his little system will work together and stand up under the test of continued service. The man who has started and suspects that he may have made mistakes is looking out for a means of correcting them before he buys the next order. In deciding on some classes of goods the problems are apt to be rather disturbing unless the man develops a desire to gain more clearly a view of the reasons for certain conditions. After a salesman has explained why his five-bar generator will give better service than his machine having four magnets, and why sixteen hundred ohm ringers are preferable to those of a thousand ohms, the man in the market has obtained a glimpse of new measures.

It is here that he will benefit from insisting upon having reasons, the knowing of which will save him from future trouble. He does not want to repeat the experience of the man who was duped into purchasing the wares of an unscrupulous agent who closed the deal by declaring that his ringer had two hundred more ohms and therefore was more suitable for his service, and added as a further inducement that it sold for a third less money. But when he realizes that a mistake is made a practical man who makes telephony a side line is not going to worry about the nature of an ohm. He is going to look around among other telephone systems in the same class as his own, and see what kind of telephones are making good. If a man belongs to a good district organization it will not take him long to find out what different kinds of material seem to be giving satisfaction after a thorough trial. Of course a man has to go carefully, because an unsuspected tree ground may be the cause of a case of poor ringing, and working equipment cannot be judged apart from its surroundings.

There are, however, many features of a telephone system outside of the more intricate, special kinds of apparatus where it would seem as if a man used to buying materials in general use could derive a great deal of benefit from the application of his ordinary experiences. As soon as a man knows the reason why insulation is necessary on a wire inside a building, and how moisture will make a conducting path between the two sides of a line, he has learned a lesson which should prevent one of the most common faults occurring in small systems. This is the use of a cheaply covered wire. Experience has shown that when inside connections are made of wire having only a thin, poorly wound thread covering trouble is to follow at an early date, due to the action of moisture. For this reason the telephone line owners who are making money have long since given up this idea and are putting in a good grade of insulated wire. Even with this they are taking no unnecessary chances with damp places or poor fastenings. The day of the metal staple, covering both wires of a pair, and hammered in hard, is past. Even the builders of the smallest systems are learning that such material and work will only last a short time and that the surest way to save their telephone money in the long run is to spend at the start enough to build substantially. The cost of telephone service is a matter vitally connected with the length of the efficient working life of the equipment by means of which it is given. Those who are successful in keeping this cost steadily down where it should be are the men who are able to judge by common sense methods not merely what their telephone lines will cost when new, but how long they will last under ordinary care. The time when this judgment comes into play is prior to the purchase of material, and of the labor which installs it.

TELEPHONES AS DEVELOPERS OF BUSINESS SYSTEMS.

ABSOLUTELY systematic use of a telephone line restricted to fulfilling a given purpose is not so very common. When a telephone instrument is approximately so used accident is more likely to be the cause than any definite design. Yet the telephone man who takes a broad view of the opportunities for extending the use of appliances familiar to him sees a large variety of enterprises involving the necessity of communication where the telephone might be used to advantage. It is a fact that the work of extending telephone service is becoming more and more the work of an expert, and the successful contract department is getting to be the one which makes the most complete study of conditions in the community where it expects to sell telephone service.

It is the intention in all such studies to determine just what part communication plays in the conduct of the business of individual firms. The next step, of course, is to provide the right kind of telephone equipment to take care of the requirements. In this way telephone companies are gradually taking upon themselves duties which, in a very small way, parallel some of the development work which has been undertaken by railways.

In many sections of the country the great railways have made a careful investigation of local business, and opportunities for business, in its relation to the industries of the country. Transportation problems have been worked out by men who have taken a keen interest in making the railways a practical factor in the development of the country. The time is coming, eventually, when a spontaneous demand for telephone service may not be too strongly relied upon. It will be a necessity, to a far greater extent than now, for telephone men to specialize in the application of communication as a force in the conduct of business. Along this line enough has already been done to indicate that there are some very attractive opportunities for the introduction of improvements and economies accompanying an appropriate special method of using telephone service. This field promises to grow more interesting as it is further developed.

TROUBLE NESTS.

IN about every telephone plant there are two or three old corners where poor workmanship and unsightly material are strongly in evidence. Such a locality as this is likely to be visited by troublemen more frequently than any other section of the exchange system. If it is a cable box with a lot of jumper wiring hanging loosely, with split pairs, poorly made joints and the other faults commonly found in such a situation, it is an unfortunate characteristic of human nature that makes every man who goes to it likely to leave it actually in a worse condition than when he came to it. These are the places that deserve a thorough overhauling at the first opportunity, to put them in first class condition.

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Telephone Cases and Decisions

CONDUCTED BY A. H. McMILLAN.

RIGHT TO OPERATE PARTY LINES.

Our franchise reads that the company shall not charge more than $1.50 per month for residence telephones and that they shall be connected by a single metallic circuit. The city council and officials now claim that we have no right to use party lines in the city. It is claimed that subscribers do not get full value for their money because very often the subscriber to a single line tries to call up a party line and is told that "the line is busy." Do you think that, under the franchise, we are prohibited from installing and operating party lines at less cost than the regular rental where subscribers want them? Do the rights of subscribers on a single metallic circuit interfere with our right to have any party lines connected with our system? H. S. Co.

IT seems to the legal editor that the city officials are drawing very fine distinctions in their construction of the franchise. I do not think that their construction is sound, because if the applicant for party line service could not get it at the reduced rate, he would, in all probability, not be a subscriber at all, and there would therefore be fewer subscribers on the line with whom the person on a single metallic circuit could get connection.

CHICAGO COMPANY NEED NOT FILE STATEMENTS OF GROSS RECEIPTS.

THE Supreme Court of Illinois has decided that the City of Chicago is not entitled to a writ of mandamus to compel the Chicago Telephone Company to file semi-annually with the City Comptroller sworn statements of all its gross receipts for the preceding six months.

The Court decides that the franchise which the city of Chicago granted the Chicago Telephone Company is a contract and that mandamus is not the proper remedy to enforce those provisions of it.

The petition of the City of Chicago alleged that a franchise to the Chicago Telephone Company was granted January 10, 1889, and that in consideration of this grant the company was to file semi-annually a statement of all its gross receipts and to pay the city 3 per cent. of them. The bill further states that these statements have been filed, but that none of them included all the gross receipts. The receipts of the company for territory lying beyond the limits of the city as they existed January 10, 1889, have never been included and the company has not paid the city 3 per cent. of such receipts. A petition for mandamus was filed in the Superior Court of Cook County, where it was dismissed, and an appeal was taken to the Supreme Court.

A COMPREHENSIVE CASE ON EMINENT DOMAIN.

A VERY comprehensive case on the right of a telephone company to condemn an easement over the right of way of a railroad company for its poles and wires is that of American Telephone and Telegraph Company vs. St. Louis I. M. & S. Railway Company decided by the Supreme Court of Missouri, March 28, 1907. The telephone company proposed to put its lines along one side of the railroad company's right of way, corresponding to the line of poles and wires of another company on the other side of the right of way, at an average of not less than thirty-five to the mile, thirty-five feet from the center line between the rails of the main track and continuing at that distance where the width and conditions of the right of way would permit, and not nearer than fifteen feet from the center line between the rails on all side tracks where the width of the right of way would permit. The poles and wires were to be of the best material, the poles to be securely braced, and at all curves so guyed as to resist the tension of the wires, and where it was necessary to cross the tracks, the poles were to be high enough to raise all wires clear of all other structures on the right of way. The railroad company objected to the proposed line on the ground that it would materially interfere with the public use to which the company's right of way was put, but this objection was overruled by the court.

Other holdings of the court were to the effect that the telephone company had the right to condemn such a right of way under the laws of Missouri; that the discretion which a telephone company may exercise in determining its route cannot be interfered with, in absence of a showing of bad faith, malicious motives, or that the taking of the tract sought to be condemned would entail a great loss which might readily be avoided. The determination of this question in such a case was held to be for the court and not for the jury. The Court also passed upon the sufficiency of the proceedings and reviewed the instructions given by the trial court to the jury. American Telephone and Telegraph Co. vs. St. Louis I. M. & S. Railway Co. 101, S. W. 576.

ASSUMED RISKS OF EMPLOYMENT.

IN an action for injuries, sustained by an employe, the question of whether he was guilty of contributory negligence in taking hold of a defectively insulated wire carrying an electric current, or assumed the risk of injury, is for the jury. Such was the holding of the Supreme Court of Illinois in a suit brought by David Hyslop against the Chicago Suburban Water and Light Company. The company was operating an electric plant and had a pole at the corner of Erie and Grove streets, Oak Park, at the top of which was a transformer. The plaintiff had been working for the company about a year and a half "chasing trouble" on its lines. On the day of the accident the company's chief electrician took the plaintiff in his buggy to the pole referred to, to look for a break in the lines. By order of the electrician, the plaintiff climbed the pole and found that a fuse in the transformer had been "blown" and so told the electrician, who directed him to put in a new fuse. The plaintiff took out the plug, put a new fuse in it, and pushed the plug back into the fuse box. The electrician then asked him in which circuit he found the fuse out.

The plaintiff told him, but the electrician could not see the wires distinctly and told the plaintiff to shake the wire that connected the fuse that was out. The plaintiff took hold of the wire to shake it and a current of electricity passed through his body and he fell to the ground, receiving the injury complained of. The wire which he caught hold of had been insulated at one time, but the insulation was then defective. Besides the holding first stated, the court decided that evidence was admissible to show that the insulation was in a defective condition, and that when men were working on outside lines in the day time, they were notified by the company before the current was turned on. Chicago Suburban Water and Light Company vs. Hyslop, 81 N. E. 379.

ANOTHER CASE OF INJURY FROM ADJACENT WIRES.

A LINEMAN in the employ of a telegraph company, while stringing wire on a pole, received a severe electric shock, which caused him to fall, resulting in his death. The poles also carried telephone wires, one of which was grounded, and two high voltage electric wires. These wires were placed next to the pole on each side about 18 inches apart. One was spliced near the pole and at such splice the insulating tape had worn and burned away, leaving the wire exposed, but the absence of insulation was not noticeable without close inspection. The deceased was an experienced lineman and was familiar with the pole and the wires. No one saw the accident, but there was evidence tending to show that the shoulder of the lineman came in contact with the exposed part of the electric light wire, while his foot was touching the grounded telephone wire which was some five feet below.

Judgment in favor of the administrator of the deceased lineman was sustained by the Circuit Court of Appeals of the 6th District, the Court holding that the questions raised by the case had been properly submitted to the jury. Memphis Consolidated Gas and Electric Co. vs. Bell, 125 F. 677.

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News of Operating Companies

THE IMPORTANCE OF STATISTICAL INFORMATION TO AN INDEPENDENT TELEPHONE ASSOCIATION.

INDEPENDENT companies in Indiana have in their state association an organization of notable strength and usefulness. The work the New York association is undertaking just now, with a view to the preparation of a complete statistical report for the state, suggests the inquiry as to the precise utility of such a report.

The answer is clearly given in the following interesting letter from Mr. C. S. Norton, the secretary of the Indiana association:

"There is no department of association work more important than the statistical department. We are fortunate, in Indiana, in being able to go to the office of the Auditor of State and there obtain complete information from the sworn reports of the operating companies in Indiana to the State Tax Board. We supplement these statistics with information from our various companies.

"One thing, especially, has this statistical work done. It has given the Independents in general increased confidence in the Independent movement, by revealing its extent and magnitude. When the Indiana association first published the fact that there were in the state 400 operating companies and more than 160,000 Independent telephones (at that time) the public considered the claim mythical, while not a few Independents thought the statistics absurd. This necessitated our giving the detailed statistics, which was done. Since that date, two years ago, we have annually given a summary, by counties, of the development and growth of the Independent movement.

Until recently, the public seemed to think that the Bell corporation operated more telephones in any given territory than the Independent systems. It has been only by the repeated publication of the statistical reports in the "Bulletin" that the information has gradually gotten to the public, until people now, as a rule, realize that, in our own State especially, the Independents have several times as many telephones and exchanges as the Bell.

"Our statistical work has developed the fact that we have in Indiana more than 400 operating companies, with 200,000 subscribers and $20,000,000 invested in the movement. Such information, when substantiated by the detailed figures, cannot be otherwise than an inspiration to the Independents themselves, as well as to the stockholders, and the public who use their system."

CUMBERLAND COMPANY, IN A HUFF, TAKES OUT FIRE DEPARTMENT TELEPHONES IN MERIDIAN, MISS.

THE city of Meridian, Miss., has been treated in an exceptionally liberal manner by the Meridian Home Telephone Company, which operates an Independent exchange there. Among the concessions granted by this company was the use without charge of the telephones necessary for carrying on all city business. The Cumberland company, which operates the Bell exchange, had a contract with the city providing for the free installation of a certain number of telephones. As its business and that of the city grew it refused to extend this free service, and as a consequence of this attitude the city refused to pay for a number of telephones when bills for service were presented. The telephone company started to take out the telephones, and by so doing aroused the wrath of all the city officials and the people about town generally.

NO PROSECUTION OF NEW ENGLAND BELL COMPANY ON ACCOUNT OF GRAND JURY INDICTMENTS.

ALTHOUGH the grand jury in Boston indicted the Bell company for violations of the law which prevents a public service corporation from putting men to work at the instigation of politicians, no prosecutions will be made. A statement recently given out by the district attorney is to the effect that the constitutionality of the provision under which these indictments were brought is doubtful, and that questions of law arising are so complicated and numerous that the district attorney cannot foresee any final and satisfactory solution of them, unless they were carried to the Supreme Court of the United States. Under the circumstances he believes that conditions do not warrant the expenditure of the large amount of time and money which would be necessary for the prosecution of these cases.

It is reported that the telephone company is no longer giving consideration to the requests of office holders in the matter of placing men. This policy of reform is practically in line with that of other Bell companies, which are not heeding requests for the employment of men from any source whatever, but will cheerfully consider reasons for letting men go, on account of lack of business to keep them at work.

INDEPENDENT COMPANY OF WHEELING, W. VA., STRENGTHENED BY PURCHASE OF NEIGHBORING EXCHANGE.

THE National Telephone Company, of Wheeling, West Va., has just effected a consolidation of its property with the exchange of the Belmont Telephone Company, which has an exceedingly valuable property on the opposite side of the river from Wheeling. The Belmont company was organized in 1898, and since then has done a prosperous business and increased the value of its plant to an estimated figure of about $300,000, by the expenditure of earnings for the extension of lines and betterments. The original capitalization was $140,000.

Hitherto the National and Belmont companies have been working in harmony under an agreement for the exchange of service, but the actual merging of the plants under one management will effect economies in operation and improve the service to subscribers within the territory affected. Subscribers in Wheeling will now have direct communication over the lines of the National company as far west as Barnesville, and from Parkersburg on the south to Pittsburg and East Liverpool on the north. President John A. Howard, of the National Telephone Company, is given credit for carrying the negotiations to a successful conclusion. The entire plant will be under the direction of W. C. Handlan, secretary and general manager of the National Telephone Company. It is understood that A. H. Doudna, who has been manager of the Belmont Telephone Company, will retain his position as superintendent of the lines which were formerly under his control.

CUMBERLAND LOSES POLES AND WIRES AT CLARKSVILLE, TENN.

THE Cumberland Telegraph & Telephone Company and the city council at Clarksville, Tenn., are in a pretty muddle, which promises to continue until the higher courts settle the point of damages between the factions. Because the telephone company did not put its wires underground, as provided by an act of the city council of Clarksville last December, Mayor Northington had all the company's wires, poles and cables cut in the business part of the city.

Last year the wires of the Cumberland company were alleged to have greatly interfered with the firemen handling a fire in the business part of Clarksville. Soon afterwards the council passed an ordinance forcing the Cumberland to place its wires in the business part of the city in conduits. This the company complained at, and had another ordinance drawn to suit its notions. The council paid no attention to the proposed ordinance, but served notice on the company that its wires must be underground within a given time. The company paid no attention to the order. Mayor Northington then extended the time to September 1, notifying the company that if work on the conduit system was not begun by that date he would do something practical. Still the company did nothing and on September 9 Mayor Northington issued orders to the engineering department

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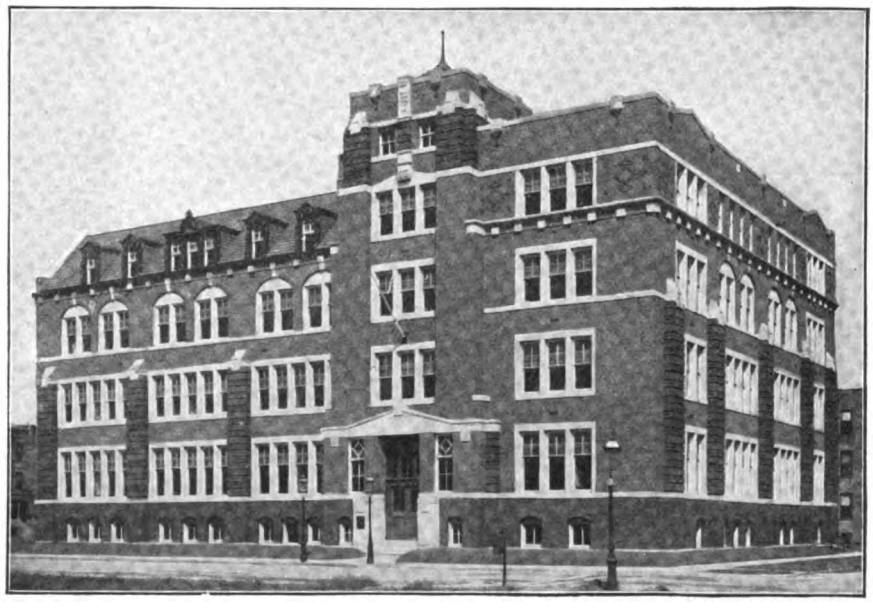
New Building for American Correspondence School

THE building recently erected for the American School of Correspondence, at Chicago, is of particular interest from both the architectural and educational points of view. If it is true that a building reflects the character of its occupant, it is easy to read the story of the American School, for this new structure is marked by solidity, dignity and usefulness. In its external, visible lines it harmonizes perfectly with the practical purposes of its design and the dignity of its surroundings; and it is also a center from which radiate invisible lines reaching to the very ends of the earth. For here are the headquarters of the largest institution in the world devoted exclusively to correspondence instruction along technical lines.

The structure partakes to some extent of the nature of an office building as well as a school. Its design was, therefore, a complex problem dictated by several different considerations. First, of course, was its intended use as a school and a center of administration; but a factor of almost equal weight was its location. It stands in the immediate vicinity of the magnificent Washington Park and the Midway Plaisance of the World's Fair fame, now an essential link in Chicago's great boulevard system. Thus it has the advantages of surroundings of great natural beauty and artificial adornment. And, in conjunction with the University of Chicago, whose administration offices stand only two blocks away, the school is itself destined to be as instrumental in making this the educational center of the city as it has been in making Chicago the center of correspondence instruction.



The New Building of the American School of Correspondence, Chicago, Ill.

This location dictated for the school a design that would in no wise conflict with the architectural scheme of the other educational structures which, in increasing numbers, are arising in the vicinity. The problem was to combine in the exterior design of a single structure the picturesqueness appropriated to collegiate architure and the solidity and stateliness required in an office building. This scheme has been worked out in the utmost simplicity by the architects, Messrs. Pond & Pond, Chicago.

The materials of the exterior are paving brick of two shades, with Bedford stone for enrichment, and moss-green tile in the roof. The brick used in the basement and projecting corners of the rustications is of a purplish red, somewhat darker than that used in the body; its depth of tone is strengthened by its being laid with dark joints. The brick in the body of the wall is a medium warm red, variegated enough to have life and pleasing texture; its general contrast to the darker material is emphasized by its being laid with white joints, and by the white finish of the window sash and frames.

The building faces south. It contains four stories and basement. The general interior plan is that of the letter E; the return of the east and west wings encloses on two sides an open court, sixty feet square, walled in at the rear and entered through an arched driveway.

The general interior color scheme is seen to best advantage in the vestibule. The high oaken wainscoting, the ceiling beams, and the furnishings are tinted a soft green; the walls and ceiling panels a warm buff, relieved with unique, conventional flowered designs in red, green and purple—the whole blending harmoniously and in pleasing contrast with the general darker tinting of the tiled floor.

In all its interior arrangements and appointments the building is most admirably and completely adapted to its double purpose. In fact, the facilities possessed by this institution for the conduct of its practical courses and the imparting of high-grade and thorough instruction, and the systematic methods that it has evolved as the result of years of experience in teaching, are in themselves a revelation of typical American ingenuity and enterprise.

The administrative offices of the school are on the second floor; the remainder of the building is used for the accommodation of the large staff of instructors, editors and other employees in charge of the various details of the work of the school. An interior telephone system connects all departments. To facilitate the work of the business office and mailing room, several of the latest electrical appliances have been installed, including adding machines, folding machines and envelope sealers—all operated by electric power. In the basement are the stock room, the shipping room and the steam heating plant. Electricity is used throughout for lighting purposes.

On the second floor are the lecture room and the rest room for employees. The lecture room is used as a meeting place for the clubs that have been formed at the works of the Crane Co., the McCormick Harvester Co., and other large manufacturing plants in and near Chicago. At these plants students of the American School have organized, appointed leaders from their own number, and found mutual assistance in studying together. From time to time they meet in the lecture room of the school, where they are provided with instructors, apparatus, and—since most of them come direct from the shop to the school—with a substantial lunch, all for the usual tuition.

Suitable quarters and adequate equipment mean as much to the students of the school as they do to the persons who occupy the various offices. They assure speed and accuracy in the handling of the enormous mail of the school, and make possible the careful organization which is necessary to any school, resident or correspondence, that would make its work thorough and practical and keep it up to date.

It is the purpose of the American School of Correspondence to take into every home the educational facilities offered by the best resident technical schools; to make it possible for every man, irrespective of age, occupation or condition, to educate himself at home during his spare time; to give the wage earner, the mechanic, the man who has "never had a chance," an opportunity to fit himself for the position in life which he desires to fill. For the furtherance of these noble purposes this splendid building was planned, and to them it is dedicated.

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to clear the streets of Cumberland property. The City Engineer's crew began their work and by night all the wires in the business part of the town were down and the poles had been cut off at the ground. About 800 telephones were put out of service, and only one long distance line was left operating.

Later the Mayor agreed to allow the company to replace and operate the wires which had been torn down until the matter could be settled. This privilege the Cumberland company took advantage of, and it is again operating temporarily its system at Clarksville. The Cumberland company has recently filed suit in the Chancery Court to test the validity of the ordinance which was passed by the city forcing the company to place these wires underground in the business district. Mayor Northington says that if the first ordinance appears in the court test to be defective another will be passed at a later date that will stand the test, and that the Cumberland company will eventually be forced to go underground.

INDEPENDENTS ACTIVE IN NEBRASKA.

THE Independent telephone plant at Norfolk, Neb., is well under way, all the underground work being completed, pole lines set and all messenger strand will be in place by November 15th. This plant, which is being installed under the direction of Mr. W. J. Stadelman,, will be an all-cable plant with wires in the business district of the city underground. A new two-story pressed brick building is being erected and it is expected that service will be given from equipment in this central office not later than January 15th. The company will be known as the Norfolk Long-Distance Company. It has built long-distance lines to Hoskins at which point connections will be made with the New State Company, of Sioux City, which is now closing up the gap from Wakefield to Hoskins. Upon completion of this line Norfolk will have long distance connections as far north as Minneapolis and St. Paul and will also give service over copper wires by way of Sioux City to Council Bluffs, South Omaha and other points east. The Norfolk company is also building long distance lines throughout the county which will give a southern outlet from Columbus and Fremont and which will be connected with the long distance lines of the state building from Omaha west along the Union Pacific, taking in the territory covered by Fremont, Columbus, Central City, Grand Island and Kearney. The completion of this line will provide Independent service for the entire eastern half of the state of Nebraska. In the immediate territory tributary to Norfolk, there is now under way considerable building of lines, which will be completed or in service before the first of the year.

Hoskins has just completed the installation of a system which will start out with over 200 subscribers. There has also been a new company organized at Madison, which is building an up-to-date exchange in that town. This company has over 200 farmers' line connections at present and as most of the subscribers are stockholders it is in a position to receive the maximum support of the local people. This exchange expects to open with over 400 subscribers. Long distance lines are being constructed between Norfolk and Battle Creek to be continued along the C. & N. W. Ry. to Tilden. All construction in this territory is standard in every particular and it is the aim of the Independents to have all their equipment so modern and good that it will be able to give a first class efficient service, which their competitors will be unable to equal.

CHICAGO TELEPHONE COMPANY'S NEW FRANCHISE.

AN ordinance granting the application of the Chicago Telephone Company for an extension of its franchise for twenty years, was passed on November 7th by the Board of Aldermen in a session which lasted nearly seventeen hours. Mayor Busse signed the ordinance four days later. A schedule of rates practically as outlined by the company was adopted. The terms of the ordinance granted the Chicago Telephone Company the privilege of operating a system for the electrical transmission of sounds and signals in the streets of the city until January 8th, 1929. The company is required to pay to the city semi-annually 3 per cent. of the gross receipts of all its telephone business both inside and outside of the city. Provision is made whereby the city upon twelve months' notice may purchase for municipal operation the plant and equipment of the company on January 1, 1919; January 1, 1924, or at the expiration of the grant in 1929; price to be paid being the cost of duplicating the equipment, together with a bonus equal to 5 per cent. of that amount as compensation for the compulsory sale.

The ordinance provides for the following rates:

Business Telephones—Flat rate, single party lines, $125 per year; measured service, single party lines, 1,200 outgoing calls, $60 per year; next 2,400 calls, three cents each.

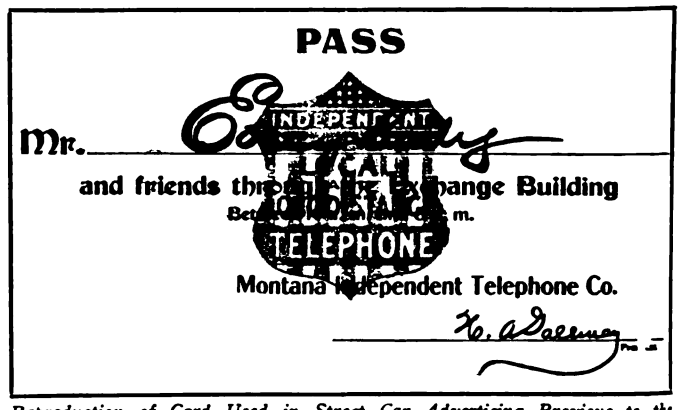
For all calls in excess of 3,600, two cents each. Additional single line to be given free for each 6,000 calls at two cents each in excess of 7,200 calls. Private exchange, $365 a year. Additional lines, $6 per quarter.

Residence Telephones—Flat rate, single party, $18 per quarter; two-party, $14 per quarter; nickel slot service, for outgoing calls, single party lines, twenty cents per day; two-party lines, twelve and one-half cents per day; four-party lines, five cents per day, and public telephones, for any message within the city, five cents.

SECOND DISTRICT INDEPENDENT TELEPHONE ASSOCIATION OF MICHIGAN HOLDS CONVENTION.

AT Adrian, Mich., on October 23rd, the Second District of the Independent Telephone Association held a convention which proved to be a very rousing and encouraging session. The State President, E. B. Fisher, of Grand Rapids, made an especially forceful talk in which he appealed to the telephone members to fight the passage of the measure to place the telephone companies under the ad valorem tax system. A committee was appointed, consisting of one member from each county, who will use their strongest efforts to fight the measure upon its next appearance before the legislature. Everyone spoke in terms of the highest confidence in the Independent movement in Michigan.

Talks and papers were presented by Mr. E. B. Fisher, Grand



Reproduction of Card Used in Street Car Advertising Previous to the Opening of the New Independent Exchange at Butte, Mont., Nov. 4, 1907.

Rapids; J. P. Boylan, Detroit; N. F. Wing, Grass Lake, and W. S. Vivian, of Grand Rapids.

The officers elected for the following year are: President, B. C. Smith, Homer; secretary, C. G. Fitsimmons, Reading; executive committee, Harry Baldwin, Leslie; C. R. Kehoe, Jackson; C. B. King, Ann Arbor; W. O. Hunt, of Adrian; G. G. Sherk, Litchfield; J. Babcock, Quincy; John Rentz, Blissfield, and H. H. Taylor, Marshall.

The following legislative committee is also elected to co-operate with the State Association on all matters of legislation: A. A. Burch, Battle Creek; C. B. King, Ann Arbor; F. W. Gradolph, Dundee; W. O. Hunt, Adrian; C. G. Sherk, Litchfield; F. M. Howard, Burr Oak, and N. F. Wing, Grass Lake.

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"THE ORIGINAL GRAY"

GRAY PAY STATIONS PAY
WHY?
Quick Service and Low Maintenance
With Gray Stations You Simply Drop in the Coin
NO LEVERS OR SPRINGS

GRAY TEL. PAY STATION CO.
HARTFORD, CONN.

SEND FOR OUR CATALOGUE ✐ IT'S WORTH HAVING

THE IMITATORS' WA

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Operators desiring to spend the winter in a mild climate can secure employment by applying to the Peninsular Telephone Co., Tampa, Fla. Reference required with application. 968

WANTED—Position by competent young man as manager or superintendent of telephone exchange. Five years' experience and technical education. Married, temperate, good references. Address Box 969, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 969

WANTED—Position as cableman by man with 3 years' experience. Permanent location preferred. References given. State salary. Address Box 970, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 970

POSITION WANTED as Superintendent or Manager of growing company in the East. Five years' experience in all branches. Best references. Address Box 971, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 971

POSITION WANTED by switchboard and instrument man; 11 years' experience on magneto systems. good reference; temperate, age 24. South or Southwest preferred. Address Box 964, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 964

WANTED—Fifty students for instruction in Practical Telephony by experienced engineer. Student graded according to present knowledge. Special price now fifty cents per lesson. SCHOOL OF TELEPHONY, Box 1135, Oklahoma City, Oklahoma. 965

EXCEPTIONAL business opportunity for practical telephone man with some capital to invest in new construction and manage an Independent telephone system of exchanges, toll lines and 500 'phones connecting six towns in a growing, prosperous wheat and timber country. Address 315 Empire State Building, Spokane, Wash. 967

WANTED--Continued

WANTED—Position with progressive Independent telephone company by competent man having nine years' practical experience. Address G. W. Kent, 330 East Rich street, Columbus, Ohio. 966

WANTED—Six good common battery switchboard installers. Give reference and state fully experience. Also state rate of wages per hour expected. National Telephone Co. of West Virginia, Wheeling, West Va. 962

WANTED—$5,000, 5 to 10 years' time, 6 per cent. interest. Interest payable annually or semi-annually. Security gilt-edge. Address Box 945, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 945

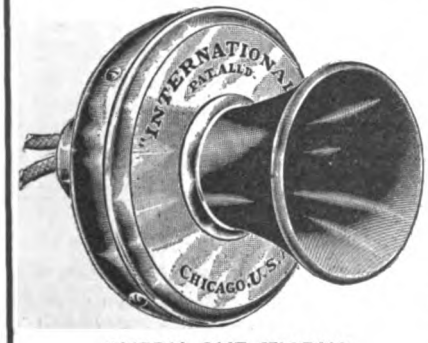
CABLE SPLICER wants position. Several years' experience in Telephone, Telegraph and Power Work. Best of references. South or West U. S. preferred. State wages, etc. Address Box 942, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 942

WANTED—Position. Thirty-three years of age, with 4 years' technical training; 7 years' practical experience, from hole digging to Long Distance Construction, Exchange Installation and Management. Address Box 943, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 943

EXPERIENCED telephone accountant and auditor desires position with more room for advancement. Can systematize your business and give you results. If looking for thoroughly reliable and competent man, I can suit you. Address, Box 963, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 963

About the only place a "free puff" could be of any use would be in the technical papers that won't print it.—*Selling Magazine.*

INTERNATIONAL TRANSMITTERS



EVERY ONE WORKS

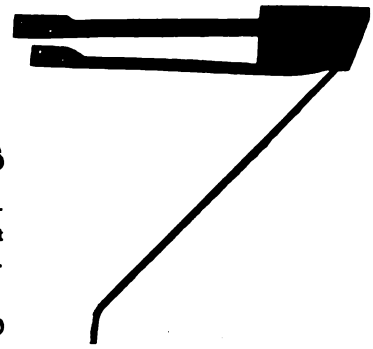
Guaranteed to give a loud, clear tone and DON'T fry, sizzle, pack or go dead.

Built to Fit Any Style Arm

We Make a Full Line of Telephone Apparatus

Send for Catalog
INTERNATIONAL Telephone Mfg. Co.
Harrison and Clinton Sts., Chicago, U. S. A.

$1.00 YANKEE Pole Seats



made of 1½ in. angle iron, painted with a weather proof asphalt paint, to which is bolted a 1⅛ in. seasoned, creosoted pine seat,

Strong—Durable—Cheap

Other specialties described in our bulletin may be had for the asking.

The Telephone Appliance Co., Minneapolis, Minn.

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Questions on Theory and Practice

HOT WIRE VOLTMETER.—(940.)

Kindly inform the writer, either by letter or through your valuable paper, the details of construction of hot wire voltmeters, and advise as to the efficiency of these instruments as compared with other types. Would not the temperature of the place in which the instruments were being used have a tendency to cause a variation in the readings obtained?

E. S. M., Kansas.

INSTRUMENTS for the measurement of electricity employing indications resultant of the expansion and contraction of wires carrying current first made their appearance in forms of the Cardew type.

In these a fine wire was run over a pulley carrying an index, one end of the wire being rigidly attached and the other end held taut by a spring. When current passed along this wire, the wire expanded, the slack was taken up by the spring and the pulley rotated. Upon cessation of the current, the wire cooled and contracted, the pulley reversed and its pointer returned to zero.

Although instruments of this type could be used on either direct or alternating currents, they possessed the disadvantages of burning out on accidental overloads, of the wire becoming stretched or otherwise distorted, of consuming a larger amount of current than the other types, and of requirin a long case. In the arrangement shown in Fig. 940 these defects are eliminated and the operation is as follows:

A wire *A B*, of non-oxidizable metal, having a high resistance and low temperature coefficient, is secured at one end of a plate *C*. It runs over a pulley *D* mounted on a shaft *E* and its free end is attached to the other end of *C* from which it is insulated.

A spring *F* keeps the wire taut and takes up any slack imparted to the wire by the passage of current. Current only flows in the portion of wire *A* between *C* and the pulley *D* where the coiled connection is shown.

When *A* is heated by current flow it expands, *F* taking up the slack, pulls *A* round *D*, and rotates *D* and *E*.

In order to give the indicator sufficient swing to allow a scale being used, large enough for easy reading a magnifying device is employed. *G* is a forked rod attached securely to *E*, at its lower end a silk fiber fastened between the forks passes around a pulley *H* to which is attached the pointer *I*.

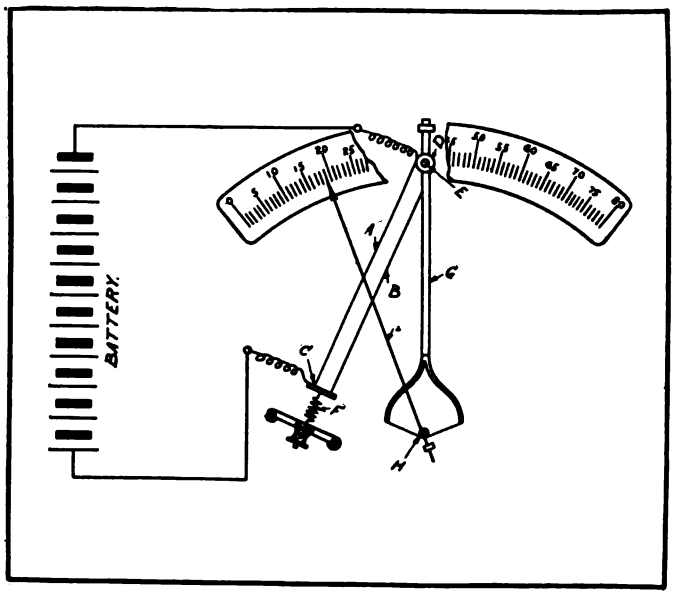

Fig. 940.

The rotating of *E* moves *G*, the silk fiber rotates *H* and the pointer, thus magnifying the movement of *G*.

In answer to your second question you will readily see that any temperature variations will affect *A B* equally so that the instrument will therefore be self-compensating. The tension of *F* being slight, wire *A B* is not under a heavy strain, it more nearly returns to its original length after current ceases and the construction is such that it can be adjusted to zero very readily if necessary.

CONNECTING OPERATORS TOGETHER ON SWITCHBOARD.—(941.)

Kindly publish at an early date a diagram showing how to connect the operator's set on two positions of a switchboard so that one operator can handle both positions, or that they may be separated by a switch for two operators.

H. R. M., Iowa.

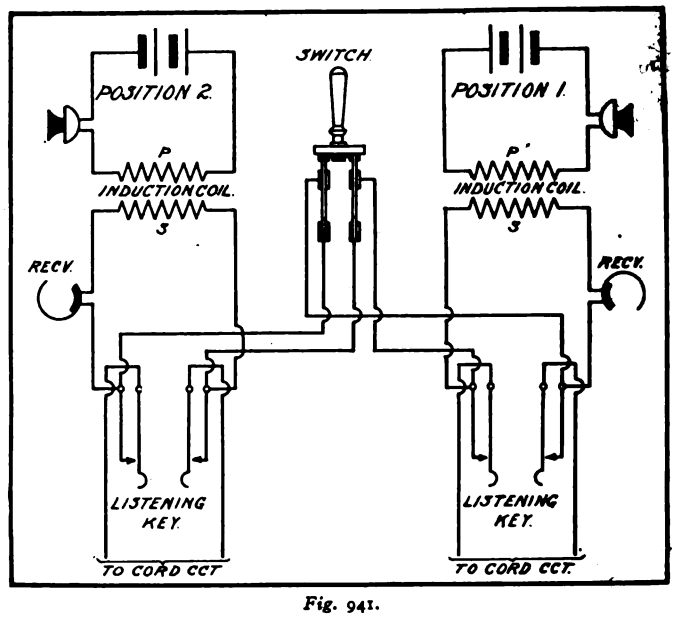

Fig. 941.

ONE method that may be used for connecting together the operator's positions is shown in Fig. 941. There are many ways of doing this, but the plan indicated is as simple as any. When the switch is closed the operator's sets are connected together, and when it is open they are separated.

The wires which are connected to the switch are, you will readily note, connected to all of the listening keys on the keyboard by attaching them to the wires that run to the operator's receiver and the secondary winding of the operator's induction coil.

The switch may be mounted at any convenient place on the switchboard. If a small, neat baby knife switch is used, the best place to mount it would be on the front of the switchboard between the two answering jack panels, where either operator can easily reach it, or a key mounted in the switchboard could be used.

HOW TO MAKE GROUND CONNECTION TO LEAD GAS PIPE.—(942.)

We frequently find it convenient to make connections for ground wires to lead gas pipes in the basements of houses in which we install telephones. However, as the pipes are of lead and the gas is flowing in them all the time we cannot solder the wires and therefore have trouble in securing good connections that will not develop resistance. Will you kindly explain how this can be accomplished satisfactorily.

T. P., New York.

THE result you desire may be secured very easily by making your connections as follows: First thoroughly clean the lead pipe for a space of about six inches by scraping, then wrap two layers of tinfoil over the cleaned portion. Wrap not less than ten turns of your ground wire, which has been thoroughly cleaned, around the tinfoil very tightly. Over the wrappings of ground wire place two more layers of tinfoil. After having completed these operations tape the joint well, first with rubber tape and then with friction tape, and you will have a joint which will last.

In making ground connections to gas pipes connect a piece of wire around the meter so that it will offer no resistance to the circuit.

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A THIRTY DAY OFFER

Do not leave this line if reported "busy." We mean to help every manager and each subscriber who has not yet helped himself.

ACTIVE ONES HAVE.

For many months these have had great increase in gross revenue, but greater increase in net revenue as a result of the

Adoption

of the

EASOPHONE.

New subscribers were obtained. Old ones took additional instruments. Maintenance costs were reduced. Cases of "trouble" one-quarter of that with same number of instruments of old type.

And why?
It is
the one phone
never
in trouble.

FOR MAGNETO AND COMMON BATTERY SYSTEMS.

Our offer is made to the large company, small company and individual.

WRITE FOR IT.

The Wire and Telephone Co. of America, Rome, N. Y.
Manufacturers of Telephones, Telephone Supplies, Bare Copper, Annunciator, Magnet and Rubber Covered Telephone Wire.

See Our Exhibit at the Electrical Show, Chicago, January 18-25, 1908.

THE CALCULAGRAPH

Promotes Operating Efficiency

Because it obviates the necessity for talking between operators and enables them to concentrate on the most important work in hand—that of making connections between subscribers. It relieves operators of clerical work and nerve wear and tear.

IT MAKES NO CLERICAL ERRORS

Get Our Reason Why Booklets.

CALCULAGRAPH COMPANY

1437 JEWELERS BLDG., NEW YORK CITY

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.

Lightning Effect No. 4

Direct Cloud Lightning Stroke

THERE are many discharges which take place in thunderstorms between clouds and earth which apparently are not only of very high potential, but also of very large current volume.

¶ Trees and poles are sometimes completely shattered by such strokes.

¶ It is unreasonable to expect to be able to provide sufficient line insulation to prevent such strokes from going to ground.

¶ There is also another source of disturbance from lightning which is not usually referred to in discussions of lightning troubles.

¶ That is where direct strokes upon objects, such as trees, immediately adjacent to the line create a charge of excessive potential on the line.

¶ These direct strokes and inductive charges which so greatly exceed the capacity of the line must get to ground.

¶ These will in all cases choose the shortest and most direct path.

¶ With your lines protected in the ordinary manner this path is quite likely to be through your telephones, switchboard or down a pole.

¶ Any one of these paths will prove expensive to you.

SKY ROCKET ARRESTERS,

however, present a direct and easy path to earth, as no lightning stroke will pass the succession of coils into which the choke-coil is built, and

THEY ALWAYS PROTECT.

Cost Small—Savings Large

Write to-day for sample

CHANCE MFG. CO.

CENTRALIA, MO.

EFFECT No. 5 NEXT WEEK

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Telephonic Inventions

MEASURED SERVICE SYSTEM.

J. L. McQuarrie, Oak Park, Ill., patent 869,450, Oct. 29, 1907; assigned to W. E. Co.

The system described in this patent comprises an arrangement of call register devices in connection with the central office switchboard equipment adapted to selectively determine the identity of the instrument on a party line calling for connection.

The selection and operative connection with the line of the connection register at the central office corresponding with a particular sub-station is determined by means of a current controlling device included in the bridge of the line at one of the sub-stations which includes the telephone and is controlled by the telephone switch hook. The current controlling device is a high resistance which, by its inclusion in the telephone bridge, reduces the current flow in the line when the telephone is taken for use to the point where it is insufficient to actuate register selecting mechanism provided at the central office, while sufficient to display the calling signal, the non-operation of the selecting mechanism leaving the register corresponding with the calling station in operative relation with the line; while the current when the other station calls is adapted to be sufficient to operate the selecting mechanism, as well as the calling signal, and thus serve to disconnect the first register and operatively associate another register with the line.

LINE FUSE.

F. B. Cook, Chicago, Ill., patent 869,060, Oct. 22, 1907.

The invention described in this patent consists of an enclosed fuse and holder adapted to be attached to the line wire in such a manner as to lie in a position substantially parallel to the line wire, but a trifle off center, so that the fuse holder will not interfere with other wires attached to the same pole.

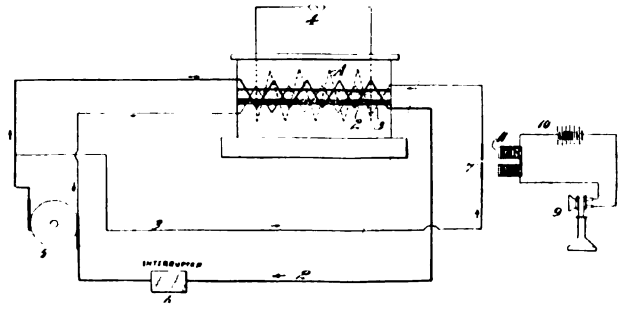
WIRELESS TELEPHONY.

H. A. McCarty, administrator of F. J. McCarty, deceased, San Francisco, Cal., patent 867,895, Oct. 8, 1907, assigned to McCarty Wireless Telephone Co., San Francisco.

This patent relates to an arrangement of apparatus for the wireless transmission of sound vibrations, by causing discharges at the spark gap 4 which will approximate the variations in the human voice.

The variations of the current in the circuit 3, which is in series with the arc light 7, are effected by means of a telephone transmitter 9, connected through batteries 10 to an electromagnet 11.

This magnet is energized by the battery current and its



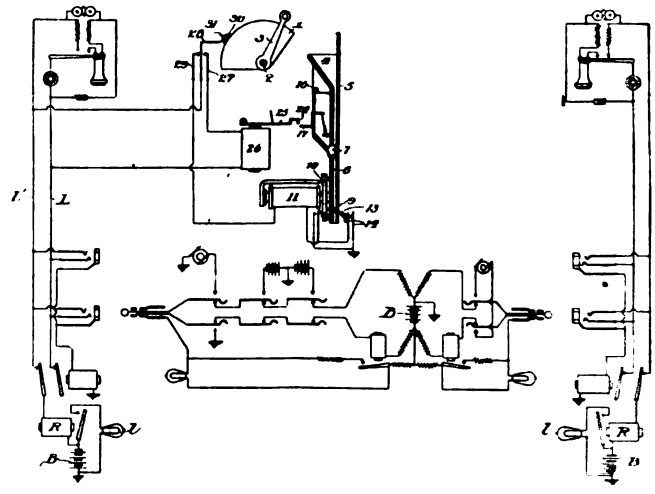
strength varied by the increase and decrease of the resistance of the transmitter 9 due to the vibration of its diaphragm.

The magnet is placed in close proximity to the arc light and the lines of force generated in the magnet 11 influence the arc so that the current flowing through the circuit 3 and the arc is varied in unison with the variations induced through the transmitter and its connections. The primary 3, which is in series with the arc light 7, is thus also varied and as the steadiness of this current on which the neutralization of the magnetic field of the primary winding 2 depended is varied, similar fluctuations occur in the magnetic field of 2 and discharges take place through the spark gap 4 which will be, so the inventor states, in unison with the vibrations of the human voice projected into the transmitter 7.

COIN COLLECTOR.

J. L. McQuarrie, Oak Park, Ill., patent 867,746, Oct. 8, 1907, assigned to Western Electric Co., Chicago.

This patent describes a form of coin collector for telephone pay stations comprising improvements in a combination of the



mechanisms described in patent 728,309 granted to C. E. Scribner and patent 846,500 granted to F. R. McBerty and H. B. Holmes.

The operation of the coin collector in connection with the circuit shown is as follows:

The subscriber desiring a connection, deposits a nickel in the opening leading to the carrier 1 and then pulls down the lever 3, thus tilting the carrier in a position to deposit the coin into the mouth 4 of the coin chute 5. In the movement of the carrier, the coin moves the lever 20, and the contacts of springs 27 and 28 are closed, while those of 28 and 29 are opened.

The extension 19 of the lever 20 being thus moved, the stop 7 is withdrawn from the entrance to the passage 6, for although the circuit through the magnet 26 is closed at 27, 28, it is still open at the central office. The nickel, therefore, falls in position on the stops 9, 9a and closes the contacts 14, 14. Upon the handle 3 being released, the carrier 1 returns to its original position and the contacts of springs 28 and 29 are closed.

This closes a signaling circuit from ground through contacts 14, 14, the polarized magnet 11, contact springs 27, 28, the line L', the line relay R and battery B to ground. The current thus made to flow through this circuit causes the glowing of the line lamp l.

If a local connection is desired no further deposit of coin is required and the coin k held on the stops 9, 9a, is deposited or refunded as the case may be, but if a toll connection is desired, this original deposit is refunded and the subscriber informed of the amount necessary to secure the desired connection, which sum is then deposited and the denomination of the coin indicated to the operator by signals in the customary manner.

COIN COLLECTOR.

E. B. Craft, Wilmette, Ill., patents 867,707, Oct. 8, 1907, assigned to Western Electric Co., Chicago.

In this patent is described a coin collector so arranged in the telephone circuit that the deposition of a coin is necessary before the attention of the central office operator can be secured for the purpose of stating the connection desired.

Means are provided in the shape of controlling electromagnets operated from the central office for the refunding of the coin to the subscriber or its deposition in the coin box according to the conditions resultant from the operator's endeavor to secure the called for connection.

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Laugh! and the World Laughs With You

COMIC SUPPLEMENT

Squeal! and You Squeal Alone

Miss "Monthly" was Spanked! She Squeals

AMERICAN TELEPHONE JOURNAL'S $1,000 circulation challenge was made in good faith. We have yet to be called on to make good this offer.

Mr. Theodore Gary is President of the International Association—the proposed beneficiary. He is "from Missouri." We have to be "shown," too. If the Association is entitled to the $1,000, we and also he should know it.

Therefore we propose: That a representative of AMERICAN TELEPHONE JOURNAL, a representative of "monthly" and Mr. Theodore Gary shall witness and vouch for the authenticity of "monthly's" August Post Office receipts, alleged to have been presented to the Telephone Manufacturers' Association.

Following are the developments in the circulation investigation up to the present moment:

AUGUST 19TH—Mr. J. G. Ihmsen, President of the Telephone Manufacturers' Association, sent this letter to "monthly" and in a slightly modified form to other telephone publications:

> " 'Monthly' Publishing Co.:
> "The writer respectfully requests that you forward a certified copy of Post Office receipts for your August issue and statement showing number of paid subscriptions at that date.
> "The members feel that in buying their advertising they should be correctly informed as to the circulation of the several publications.
> (Signed) "J. G. IHMSEN,
> "President Telephone Manufacturers' Association."

SEPTEMBER 18T—"Monthly" editorially lays claim to a "minimum" circulation of "over 10,000 each and every issue." In November "monthly" backs down and claims only a little over 7,500 for August. We know it did not print anywhere near this number of copies.

SEPTEMBER 18TH—Was the date "monthly" answered Mr. Ihmsen's letter requesting August circulation figures. But, instead of furnishing a statement of its August circulation, "monthly" gave September figures. Did "monthly" give a statement of its paid circulation or is there evidence on record of its having done so? "Monthly" offers the flimsy excuse that it thought its latest circulation figures were wanted, yet it waited nearly a month before making a statement. And again, in its October issue "monthly" said: "The resolution of the Manufacturers' Association did not call for statements for August." Now in its November issue "monthly" admits that August was the month asked for by the Manufacturers' Association.

OCTOBER 4TH—The President of AMERICAN TELEPHONE JOURNAL lunched with Mr. Ihmsen, President of the Telephone Manufacturers' Association, and in conversation Mr. Ihmsen stated that he had received from "monthly" what purported to be a statement of September circulation, but that he had returned it to "monthly," calling to their attention that he wanted August figures—NOT SEPTEMBER.

OCTOBER 5TH—We put forth our $1,000 circulation challenge.

OCTOBER 7TH, 8TH, 9TH AND 11TH—The President of AMERICAN TELEPHONE JOURNAL had conversations with the secretary of "monthly publishing company." No claim was made for the $1,000.

OCTOBER 11TH—A meeting of the Telephone Manufacturers' Association was held at the Auditorium Hotel, Chicago. The President of AMERICAN TELEPHONE JOURNAL was with the President of the Manufacturers' Association a considerable length of time, both before and after the meeting, but no mention was made of "monthly's" August circulation figures having been given to the Association.

OCTOBER 15TH—The President of the Telephone Manufacturers' Association returned AMERICAN TELEPHONE JOURNAL'S August Post Office receipts. Not a word did he say of "monthly's" alleged report.

OCTOBER 29TH AND 30TH, NOVEMBER 3D—The President of AMERICAN TELEPHONE JOURNAL had conversations with the President of "monthly" and was not informed of any delivery of August circulation and subscription figures to the Manufacturers' Association.

NOVEMBER 4TH—November issue of "monthly" received by AMERICAN TELEPHONE JOURNAL in which great space is given to "bluffs." This was the first and is the only information we had of any notice having been paid our $1,000 challenge by "monthly."

NOVEMBER 14TH—Up to the time of going to press with this issue no communication has been received concerning August circulation figures of "monthly" from any source.

On the face of these returns we ask the Manufacturers and Operators of the telephone field: Has AMERICAN TELEPHONE JOURNAL made any but the most honest and honorable statements, both of circulation and proofs offered? Have we not backed up every statement with proofs and can our "monthly" say as much?

In Reference to Kellogg!

We will, in our next issue, tell the true reason why "monthly" LOST the advertising of the Kellogg Switchboard & Supply Company.

Watch for This Statement Next Week!

SOME HISTORICAL NOTES OF INTEREST

JANUARY, 1907—The latter part of January Mr. E. J. Mock, up to that time Secretary and Treasurer of "monthly publishing company," withdrew as an officer (but remained a stockholder) of that company and purchased another telephone publication.

MAY, 1907—In his May issue Mr. Mock printed a statement, claiming an average circulation of 4,666 copies for his issues of March, April and May, and in every issue since then has claimed a minimum circulation of 5,000 copies. It is only fair also to say that Mr. Mock is entitled to credit for being the first telephone publisher to print his circulation figures.

As Mr. Mock had entered the field as a direct competitor of "monthly," would it have been good business for him to boast of a circulation LOWER than "monthly's" circulation, which was of course KNOWN BY HIM? No! Mr. Mock knows that the circulation of "monthly" was less than he is giving his new publication and that "monthly" cannot dispute that fact.

A FINAL WORD!

"God made man with one tongue and two ears that he might hear twice as much as he says."

"Omega oil philosophy admonishes us to use the top of our head more and our tongue less."

"It is an old axiom that silence is the first resort of the wise and the last resort of the foolish."—These epigrams are culled from pages 227-8-9 of the April, 1903, "monthly."

Good advice "monthly"—for you. Why don't you practice what you preach?

Really, we don't want to have to "spank" you again. The truth is known now, and we know you can be real nice when you want to.

This is our final word about circulation, unless—

But if we have to, there may be four spanks administered in December—in our issues of the 7th, 14th, 21st and 28th.

And each "spank" will have an audience of over 6,000.

Will that be a circulation of 6,000 or won't it rather be over 24,000—our December circulation?

Won't it prove the truth of that famous saying of the well known "telephone advertising expert," Elmer E. Smith:—"THE MONTHLY IS NOT IN THE RUNNING!"

Good bye!

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News from the Factories

A NEW LINE LIGHTNING ARRESTER.

AN arrester in which many new points of construction, radically different from those usually employed are incorporated, and in which the causes and effects of lightning are dealt with and provided for, is one that is well worthy of investigation and trial by telephone men.

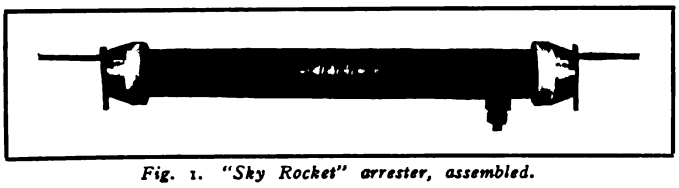

Fig. 1. "Sky Rocket" arrester, assembled.

The Sky Rocket Arrester, which is constructed in such a manner as to be connected in series with a telephone line, is shown assembled in Fig. 1, with a portion of the ground shell cut away to show the choke coil.

The construction of this arrester is exceedingly simple and strong. A helix of twenty-two turns of wire, the same size and kind as the line it is to be used upon, is coiled upon a porcelain tube; a metal tube, to which is attached the ground wire, is passed over the helix and is of such a diameter as to be separated from the helix by a very small air space. The coil on the porcelain tube is held in its place and separated from the ground tube by porcelain bushings at each end.

A bolt is passed through the end bushings and the inner tube, thus holding all parts together securely.

The coil of bare wire, within the grounded tube, presents a continuous discharge surface of over fifty inches along the inner surface of the grounded cylinder, and, in addition to this, the cylinder also presents a discharge surface of over forty-nine square inches which the manufacturer claims as a very strong factor in producing the high efficiency of his arrester.

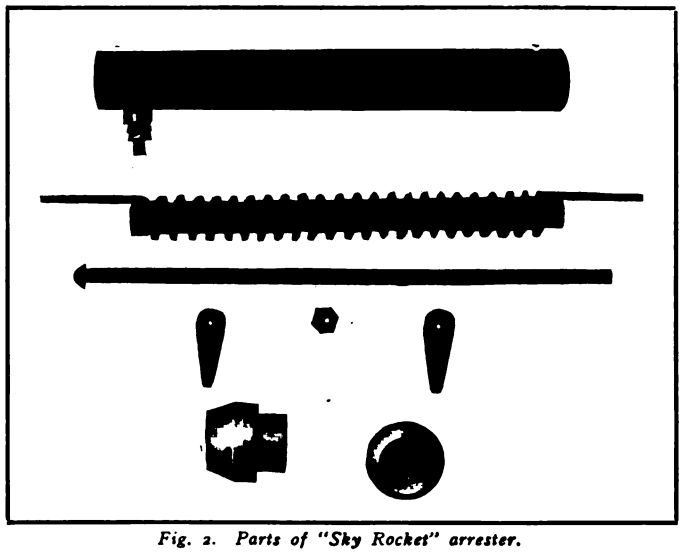

Fig. 2. Parts of "Sky Rocket" arrester.

The tendency exhibited by zinc to resist the building up of an electric arc is considered, and the coiled wire and the inner surface of the cylinder are treated to a heavy coating of this metal by the galvanizing process, so that danger of the destruction of the arrester from such causes is eliminated.

In Fig. 2 the parts of the Sky Rocket Arrester are shown. This illustration shows very clearly the metal cylinder with binding post for ground wire, the choke coil mounted on the porcelain tube, the retaining bolt and nut, the drip pieces and the end bushings. Fig. 3 shows these parts assembled with the ground shell removed.

In the assembled shape the arrester is sealed so as to preclude the possibility of moisture entering the cylinder and grounding the line.

Further information about this arrester may be secured by addressing the manufacturers, Chance Manufacturing Company, Centralia, Missouri.

AMERICAN CONDUIT CO., 140 Nassau street, New York, has just issued another of its useful postal card bulletins giving specifications for Portland cement concrete. In these specifications the various essential points are covered under the separate headings, cement, sand, screenings, gravel, broken stone, water and consistency. Interested telephone managers and engineers can obtain these specifications and others issued at various intervals by writing to the company.

WIRE & TELEPHONE CO. OF AMERICA, Rome, N. Y., recently purchased the entire equipment and stock of the Reed Electric Cordage Company, of Syracuse, N. Y. Additional manufacturing capacity is provided through this purchase, so that the Wire & Telephone Co. is able to take care of the rapidly increasing demand for its products. This includes not only bare copper wire, magnet wire and rubber covered wire, but also various grades of weatherproof, office, fixture and annunciator wire. These are all manufactured according to the standards indicated by the well established trade mark, "Romeoid." This company draws the wire for use of its own insulating departments, and in this way insures consistency and uniformity in the manufacture of all its products.

GRAY TELEPHONE PAY STATION CO., Hartford, Conn., has just issued a new catalogue which will attract the eyes of every Independent telephone manager. The Gray "Shield" pay station is portrayed in colors on the cover and receives prominent mention in the booklet. This form of collector was especially designed for the use of Independent companies who wished to have it for its advertising value as well as for its practical efficiency. It advertises the Independent service, and collects the money its advertising calls in—rather an interesting combination. Other types of pay station equipment for use with all the common styles of wall sets and desk telephones are shown.

PREMIER ELECTRIC CO., 56 and 58 West Van Buren street, Chicago, Ill., has issued its bulletin No. 7, an interesting net price list of reconstructed switchboards and switchboard parts, together with telephones and supplies. This bulletin gives descriptions and prices on a considerable number of separate pieces of apparatus of standard modern makes.

The Premier Electric Co. claims that by reason of its care exercised in purchasing and repairing, this apparatus is practically equal to new, both in appearance and operating qualities. It will be pleased to send its bulletin, or any further information desired, to all interested persons.

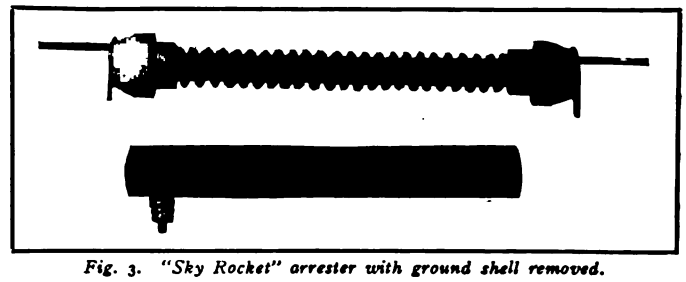

Fig. 3. "Sky Rocket" arrester with ground shell removed.

DEAN ELECTRIC CO., Elyria, O., is sending out to its customers a postal card bearing an interesting view of the new power plant now being erected in connection with important additions to its factory.

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"Arrester"

"Leave not that to chance, which foresight might provide for or care prevent."

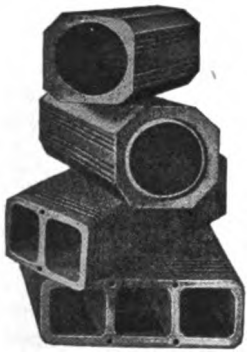
HE-IS-A-TOUGH CUSTOMER

But we have him safe!

WE will furnish the "Arrester,"
YOU furnish the "GOOD GROUND."

REMEMBER! without "Good Ground" "Arrester" has no place to take him.

SUMTER TEL. MFG. CO., SUMTER, S. C.



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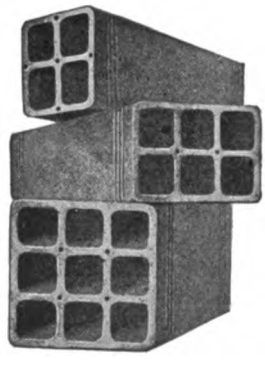
CLAY CONDUIT



SINGLE and MULTIPLE DUCT

IMMEDIATE DELIVERY ON ALL STANDARD SIZES

Factories: New Jersey, Pennsylvania, Ohio

Standard Vitrified Conduit Company

Main Offices: 39-41 CORTLANDT ST., NEW YORK, N. Y.

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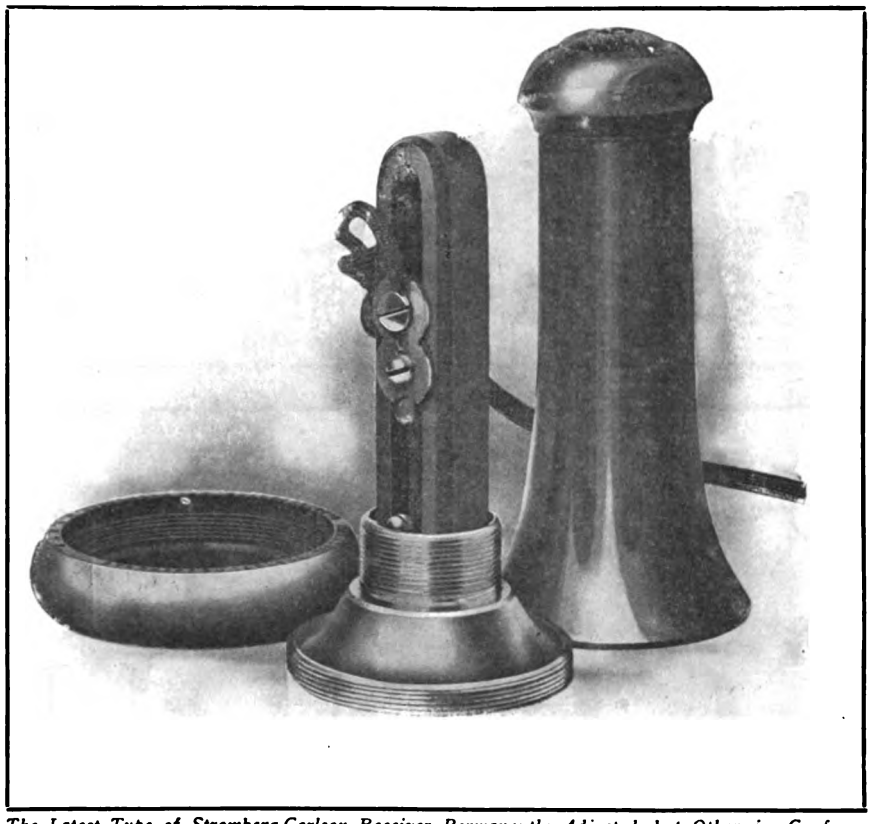
News from the Factories

THE LATEST STROMBERG-CARLSON RECEIVER.

SIMPLICITY of design is one of the strong features of the type of receiver which is now being furnished with all regular orders for Stromberg-Carlson telephones. In general appearance, and the main features of its construction, the present form of receiver resembles its predecessors, but has the new feature that it is non-adjustable, as are most high grade receivers now in the market. Magnets, as well as the front and rear portions of the receiver shell, are supported upon a cone-shaped frame punched from a metal having the characteristics desirable in such a supporting piece. The two portions of the shell are wholly independent of one another, proper relationship between them being maintained by the proportioning of the threads which permit them to be screwed on to the metal framework. Pole pieces are accurately fitted to the permanent magnet of the receiver, and firmly fastened by machine screws passing through the magnets in the supporting block. Cords are fastened to a wide metal yoke attached to the end of the permanent magnet by machine screws, and conductors lead from here to the magnet coils. This arrangement makes it possible to properly support the receiver cord, so that there will be no strain upon the connection which will have a tendency to break the circuit.

The receiver is equipped with an electrose shell designed in such a way as to have a maximum of strength and at the same time offer an especially pleasing appearance. A characteristic feature of the design is the shape of the shell at the point where the cord comes out. This shape was always associated with the Stromberg-Carlson type of receiver, and has been duplicated in the present form at the request of several of the company's customers. More detailed information, if desired, can be obtained by direct application to the company.



The Latest Type of Stromberg-Carlson Receiver, Permanently Adjusted, but Otherwise Conforming to the Previously Established Standard of Its Manufacturers.

NATIONAL CONDUIT AND CABLE CO., 41 Park Row, N. Y., is finding that its interesting four-page sheet "Copper Gossip" is being very widely read at the present time. Recent issues contain complete summaries of the fluctuations of copper, interesting statements about the general business outlook, the copper market both here and abroad, and notes giving indications of what may be expected from the mines. Telephone managers and purchasing agents may be placed upon the mailing list and receive the paper regularly by writing to the company.

GENERAL STORAGE BATTERY CO., 42 Broadway, New York City, has just issued a pamphlet of general interest under the caption "A Storage Battery in a Large Steel Works." This is a description of the floating or "line" battery of the Cambria Steel Company installed at Jamestown, Pa. Although telephone men may suspect the direct utility of this pamphlet to them from its title, it contains a great deal of valuable information as to the service requirements which can be met by a storage battery, and other matters which are not limited to any particular field of application. Copies will be cheerfully sent by the General Storage Battery Co. on receipt of applications.

RUNZEL-LENZ ELECTRIC COMPANY, 97-101 South Clinton street, Chicago, makes a specialty of its steel switchboard cords. The construction of these cords is interesting, inasmuch as the design is such as to combine strength and wear-resisting qualities with efficiency. The cords are made from a specially prepared, drawn steel wire wound with a copper wire. The steel wire, of course, gives strength and flexibility, while the copper winding gives conductivity. Each conductor is insulated with a serving first of silk, then of cotton and finally a braiding of waxed cotton. Both conductors are then formed into a concentric spiral, over which a braiding of cotton is applied for the purpose of preventing any possible stretch in the cord. A reinforcement spring of specially tempered steel wire is inserted in the plug end of the cord, where, of course, the cord is subjected to the greatest wear and strain. An over-all braiding of linen thread which has been boiled in wax, with a double braiding at the plug end, completes the cord. Further information and prices may be had by writing to the company.

THE UNIVERSAL CABLE GRIP COMPANY, Syracuse, N. Y., offers a free trial of its Cable Grips to companies pulling cable. The principle of these grips is too well known to require description, and it is at once apparent that they grip the cable tighter than is possible by the use of a marline or wire sling, and that little or no injury can result to the lead sheathing of the cable. As the grips are made in several styles they can be used for both aerial and underground pulling, for pulling in and out cable, pulling out cable broken flush with the mouth of the duct, etc.

ATLAS ANCHOR CO., Cleveland, O., has prepared some interesting information about its products. This folder states that the construction of the Atlas anchor is such that from 75 to 85 per cent. of its surface pulls against undisturbed earth. The company states that it will guarantee that this anchor will hold in all kinds of solid soil more than the connecting rod, and that it will not "heave" after being properly set. Other features of interest are set forth in a circular which will be sent free of charge on application to the company.

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For Telephone Installations

CIRCULAR LOOM

Takes the place of porcelain tubes for building entrances. A short length of several feet can be conveniently carried by the installer and cut to desired size. Much handier than porcelain tubes and there is no loss due to breakage.

AMERICAN CIRCULAR LOOM CO. TRADE MARK REGISTERED

IN TELEPHONE SYSTEMS ITS USES ARE LEGION—EVERY ONE OF WHICH MEANS MONEY SAVED

Order from your dealer or address

AMERICAN CIRCULAR LOOM CO.

CHELSEA, MASS.

NEW YORK CHICAGO SAN FRANCISCO

HOW TO OPEN A JOINT

The method of making a joint (in telephone cable) that can be opened and its advantages for testing and changing multiples are described and illustrated in a vest pocket booklet

SENT FREE WRITE TO

W. N. MATTHEWS & BRO.

211 N. 2nd Street ST. LOUIS

See our exhibit at the Electrical Show, Chicago, Jan. 13-25, 1908.

Selling Magazine Says:

Whether the advertiser gets full value from a publication depends partly on the publication and partly on his skill in presenting his product; but the subscriber, as a rule, has only himself to blame if he fails to make a very large profit on a very small subscription investment. There are comparatively few technical journals that deserve consignment to the waste basket in their original wrappers.

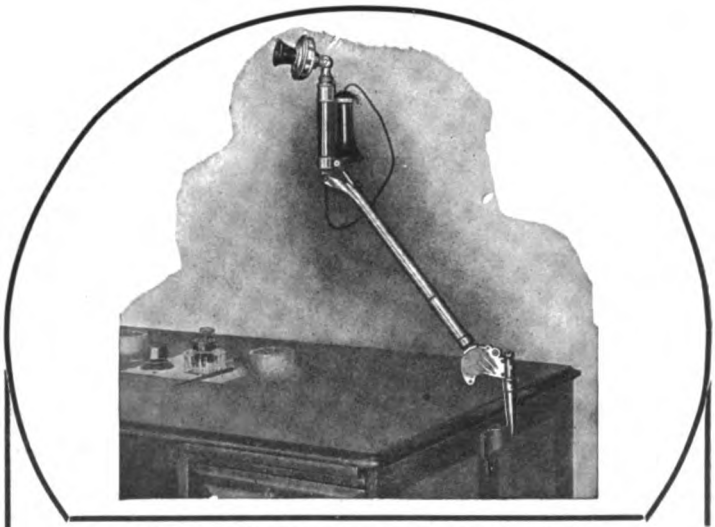
HELLO!

Right in your telephone service is the place you will notice the great difference between the "1900" Dry Battery and others. Don't take our word for it—try them, they'll prove themselves.

The Nungesser Electric Battery Co.

CLEVELAND, OHIO

Gen. Sales Office
128 W. Jackson Blvd.
CHICAGO, ILL.



"FLEXIPHONE"

THE 'PHONE OF THE HOUR

- ¶ Will save your company from 1-3 to 1-2 of your present maintenance expense.
- ¶ No more broken Transmitters or Receivers.
- ¶ Self-balancing in any position.
- ¶ Mouth-piece revolves, and always facing person talking.
- ¶ Attachable to any wood-work anywhere.
- ¶ Supplied with any Standard Transmitter or Receiver.
- ¶ Adopted by some of the Largest Exchanges.
- ¶ An ideal extension set for private office—overcomes the objections of the "always-in-the-way" desk set.
- ¶ Is the 'phone for the home—makes its own place and fits the family.

CUTS MAINTENANCE COST IN HALF

OLIVER MFG. CO., Inc. Philadelphia, Pa.

Holtzer-Cabot Electric Co. Boston, Mass.—Chicago, Ill.

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Brief Notes of Interest

NEW COMPANIES.

GREEN FOREST, ARK.—The Farmers' Union, of Carroll county, has organized an Independent telephone company, which intends to construct telephone lines in and about Green Forest. It has an authorized capital of $3,000, and the following officers have been elected: S. S. Buell, president; E. C. Dooling, vice-president; A. M. Webb, secretary; E. H. Inman, treasurer.

SOLDIER, IDAHO.—The latest Independent telephone company to be organized at this city is the Soldier Local Telephone Company, which has a capital stock of $48,000, with shares of a par value of $40. Its purpose is to build and operate about six hundred miles of telephone line on Camas Prairie, extending from Soldier, at which place the headquarters of the company is to be established, to Gooding, Boise and other points. The following directors have been named: Frank Housman, A. G. Barker, D. H. Gwinn, W. Y. Perkins and J. F. King, all of Soldier. The other stockholders are D. H. Gunn, W. H. Leek, B. J. Bean, J. H. Herrington, S. W. Worthington, A. C. Chipman, Lester Stott, W. F. Mink, W. C. Martin, J. E. Campbell, Oscar W. Perkins, A. A. Higgs, D. P. Higgs, Carl Borup, A. D. Baker, E. R. Rice, James Jenkins and John Finch.

TONTI, ILL.—The Tonti Telephone Company, with a capital stock of $500, has been incorporated, and expects to install a telephone system at this city. Among the incorporators are John H. Kreiter, Walter Cope and Jacob Hershberger.

WILKINSON, IND.—Articles of incorporation have been filed by the Wilkinson Switchboard and Telephone Company. The capital stock is placed at $500, and the following directors have been elected: Allen M. Benjamin, George W. Sowerwine, Andrew J. Walker, Samuel M. Overman, Arthur B. Harlan, Jesse L. Justice and A. F. Wales.

LANCASTER, KY.—The Kentucky Telephone & Telegraph Company has filed articles of incorporation, and the following officers and directors have been named: H. T. Logan, president; F. B. Marksbury, secretary; J. W. Elmore, treasurer; R. H. Tomlinson, attorney, and A. H. Bastin, manager. Directors: H. T. Logan, Lancaster, Ky.; L. W. Bethurum, Mt. Vernon, Ky.; J. P. Reeder, Knoxville, Tenn.; Wm. Burnett, Lancaster, Ky.; Chas. Chandler, Middlesboro, Ky.; W. R. Bastin, Lancaster, Ky.; J. I. Hamilton, Lancaster, Ky.; J. W. Creech, East Bernstadt, Ky.; J. W. Elmore, Lancaster, Ky.; R. M. Jackson, London, Ky., and H. V. Bastin, Lancaster, Ky. The company expects to carry on a long distance telephone and telegraph business in and out of the State, particularly in Central and South Eastern Kentucky, connecting with the lines of the Independent Long Distance Telephone & Telegraph Company on the north, and the People's Telephone & Telegraph Company on the south.

MONTICELLO, MINN.—A new rural telephone company, to be known as the Pelican Lake Telephone Company, has been organized by the citizens of this city.

MONTICELLO, MINN.—The Prairie Mutual Telephone Company has been organized at Monticello, and expects to commence work on its system at once.

BOZEMAN, MONT.—An Independent telephone company, to be known as the Bozeman Home Telephone Company, has been organized at this city, and work on the construction of an up-to-date telephone plant is to be commenced at once. Among those actively interested in the new enterprise is J. S. Haley, formerly, of Butte.

MISSOULA, MONT.—The Bitter Root Telephone Company, of which C. M. Allen is president, T. A. McClain secretary and Samuel McClay treasurer, has been organized at this city. Its plans cover the installation of a telephone system at Missoula, and the construction of lines to Lolo and Carlton.

SNOW CAMP, N. C.—Articles of incorporation have been filed by the Southern Alamance Telephone Company of Snow Camp. Its plans include the construction maintenance and operation of an up-to-date telephone system. The capital stock is placed at $4,000, of which $1,000 has been subscribed, and the incorporators are Nathan C. Stuart, Eula L. Dixon, John R. Stuart, Wake F. Soley and others.

ENGLEVALE, N. D.—Among the newly organized Independent telephone companies is the Englevale-Ft. Ransom Telephone Company, of this city. It has an authorized capital stock of $10,000, and the incorporators are Edward Peterson, P. A. Berg and C. B. Vold, all of Englevale.

RYDER, N. D.—The Queen City Telephone Company, of Ryder, N. D., has been incorporated with a capital stock of $50,000. Among the incorporators are Lloyd S. Officer, M. A. Officer and Irvine C. Officer.

CHATTANOOGA, OKLA.—The Comanche Telephone Company, of Chattanooga, has been incorporated with a capital stock of $5,000. Among those responsible for its formation are T. E. and F. O. Hibbard, of Snyder, and W. S. White, of Mt. Peck.

ACKERMANVILLE, PA.—Plans are being formulated at this city for the organization of a rural telephone company, whose purpose it is to install a local system.

SHENANDOAH, PA.—The Farmers' Independent Telephone & Telegraph Company has been organized by the farmers of the Ringtown Valley, and the following officers and directors elected: President, Charles Laudig; vice-president, B. F. Zimmerman; secretary, R. W. Faust; treasurer, T. W. Rumble; attorney, W. F. Lyons; directors, Elmer Dennison, Alexander Manbeck, David Davis, David Horn, Alfred Teter, W. L. Witmer, Charles Laudig, J. A. Mandour, B. F. Zimmerman, R. W. Faust, T. W. Rumble, Clarence Lindemuth and W. F. Lyons. The new company, which has already made application for a charter at Harrisburg, expects to construct a telephone line from Shenandoah to Ringtown, thence to Aristes, Mt. Carmel, Shamokin, Bloomsburg, Wilkes-Barre, Sheppton, Nuremberg and Hazleton.

NESHKORO, WIS.—Articles of incorporation have been filed by the Neshkoro Telephone Company. It has an authorized capital stock of $2,000, and the incorporators are Charles Dahlke, Charles Marks and J. S. Krueger.

RICHMOND, WIS.—Articles of incorporation have been filed with the Wisconsin Secretary of State for the Richmond Telephone Company, Richmond, Walworth county, Wis. It has an authorized capital stock of $2,500, and the incorporators are John D. Clark, George Crumb and Robert Harris.

FRANCHISES.

SILVERTON, COL.—Permission to construct a telephone line seven miles long in the Montezuma national forest has been granted to the Gold Mines & Power Company, of Silverton, Col.

MOMENCE, ILL.—After determined opposition on the part of the Central Union (Bell) Telephone Company, a franchise at this city has been granted to W. S. Fisher, of Kankakee, who represents Independent telephone interests. It is his purpose to form a stock company, backed by Kankakee and Momence capital, and install an exchange. This exchange, when completed, will be connected with the Independent company at Kankakee, but is to be operated by an entirely different company.

ELIZABETH, N. J.—The Hudson & Middlesex Telephone Company, which has recently constructed a line to this city, expects to apply to the City Council for a franchise.

PERTH AMBOY, N. J.—The officers of the Hudson & Middlesex Telephone Company, which operates lines in Carteret, Woodbridge, Sewaren, Englishtown, Red Bank, Perth Amboy and other cities, and which has recently applied for a franchise at Elizabeth, are William J. Lansley, president; Albert A. Guiges, vice-president; B. L. Lawrence, secretary and treasurer.

ELECTIONS.

DILLON, MONT.—At a recent meeting of the Southern Montana Telephone Company the following officers were elected: Leonard Eliel, president; A. L. Stone, vice-president; F. A. Hazelbaker, secretary, treasurer and general manager. The board of trustees is composed of B. F. White, Edwin Norris, W. M. Knapp, A. L. Stone, W. A. Jones, F. A. Hazelbaker and Leonard Eliel, all of Dillon; E. A. Andrus, of Fox, and C. H. Strowbridge, of Wisdom.

FINANCIAL.

BRUCE, ILL.—The Bruce Mutual Telephone Company has recently increased its capital stock from $2,500 to $5,000.

MISCELLANEOUS.

FLINT, MICH.—The Independent telephone interests which are represented by J. W. Martin, who recently made application for a franchise at this city, are planning for the formation of a new company whose lines are to connect with the lines of the Citizens Company in Jackson, the Oakland Telephone Company in Oakland County, the Home lines in Detroit, from which place Mr. Martin comes, and the Washtenaw Company in Ypsilanti and Ann Arbor.

BRAYMER, MO.—The exchange of the Braymer Telephone Company, formerly the property of S. F. Brady, has been acquired by the People's Mutual Telephone Company, and a consolidation with the Burnett system is to be effected at once. The plant under the new ownership is to be materially improved.

LASCRUCES, N. M.—The Silver City-El Paso and Southwest Tele-

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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Bois D'Arc Pins

Shield Emblem Playing Cards

FREE to Our Customers

One pack only to each address, postage paid, on mentioning this paper and enclosing an order for Telephone Materials or Apparatus.
Additional packs furnished at cost so that the Independent shield may be advertised more generally.

Better than Oak, Locust, Birch or Maple

We have sold Millions of these Pins

Close Grained, Long Lived and Strong

You should use them
SAMPLES FREE!!

NEW PRICES

Less than 2,500, per M.....**$12.00**
2,500 to 10,000, per M.....**11.50**
10,000 to Carload.....Special Prices

Immediate Shipment from Stock in Any Quantity

Central Telephone & Electric Company

Makers of High-Grade Telephone Apparatus

Main Office and Factory:
2131-37 Lucas Ave., ST. LOUIS, MO.

Dealers in Telephone Supplies (Exclusively)

120 Liberty Street, New York City
105-7 Commerce Street, Dallas, Tex.

CROSS ARMS

LONG LEAF YELLOW PINE

All Heart, Special Sizes, Plain Painted or Creosoted. Large Stocks, Quick Shipments.

LEWIS LUMBER & MFG. CO.,
Hattiesburg, Miss.

WE KNOW WE CAN SAVE YOU MONEY IF YOU ARE A BUYER OF LOCUST PINS OR LONG LEAF YELLOW PINE CROSS ARMS

That's a Pretty Strong Statement, but no matter what Quality you demand—no matter the shipment you desire—we have the stocks, the grade and the prices that will land your order.
If interested, write to-day and get Leaflet Number Four.

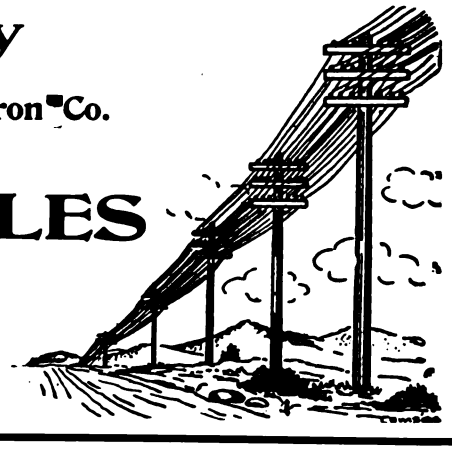
THE F. BISSELL COMPANY
TOLEDO, O.

National Pole Company

SUCCESSOR TO
Cedar Department of Pittsburg and Lake Superior Iron Co.
ESCANABA, MICH.

LARGE STOCKS OF POLES

Yards from Maine to Washington



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Brief Notes of Interest

phone Company has acquired the Texas & New Mexico Telephone Company's line between Lascruces and El Paso, formerly owned by Charles Miller. The former company, which is practically a new company, and the property of J. H. Morgan, manager of the Southern Independent Telephone Company, El Paso; W. E. Baker, of the Lascruces exchange; W. D. Murray, president of the Silver City Telephone Company, and C. B. Bosworth, of Deming, is constructing a long distance line which will include El Paso, Lascruces, Rincon, Engle, Los Palomas, Silver City, Deming and all intervening towns.

WAMPUM, PA.—The Mount Air, Lawrence Co., Pa., Telephone Company, which has been making many extensions and improvements in its plant, is soon to be connected with the exchange of the American Union Telephone Company at Wampum.

SIOUX FALLS, S. D.—A controlling interest in the Hartford Electric Light & Telephone Company, which operates a telephone system at Hartford, which is located near Sioux Falls, has been purchased by Fred Harris, of the latter city. He contemplates the rebuilding of the old system, and expects to furnish a strictly first-class service.

MAMAWA, WIS.—The telephone lines and exchange at this place, formerly owned by U. S. Brugg, have passed into the possession of John Echhoff, of Wittenberg, Wis., who expects to make many improvements in the plant.

WAUNAKEE, WIS.—The Waunakee Telephone Company has been purchased by J. C. Neill and Robert Chambers.

PERSONAL.

C. W. BURKETT, who has for the past five years held the position of chief engineer of the Wisconsin Telephone Co., with headquarters in Milwaukee, has recently accepted the position of chief engineer of the Pacific Telephone and Telegraph Co., with headquarters at San Francisco, Cal.

N. C. KINGSBURY has been elected president of the Micigan State Telephone Co., Detroit, Mich.

FRED McKINNEY has resigned his position as manager of the Edgerton (Wis.) Telephone Company and has signed a contract with the Badger State Telephone & Telegraph Company as general superintendent of its toll lines in Wisconsin.

W. G. SEGRIST, of Jefferson, Wis., has accepted the position of superintendent of the Interurban Telephone Company, with headquarters at Sun Prairie, Wis.

P. J. SKOLSKY has been appointed manager of the New District of the Wisconsin Telephone Company, which comprises the old Eau Claire and La Crosse districts. He was formerly manager of the Eau Claire district and will continue to have his headquarters in that city.

B. G. SNYDER has resigned as manager of the Ononto Independent Telephone Company and will become manager of the Antigo (Wis.) Telephone Company's Antigo exchange.

B. W. TRAFFORD was elected vice-president and general manager of the Michigan State Telephone Company at the recent directors' meeting.

Going Ahead

CORONA, CAL.—Many extensions in its system have been made by the Home Telephone Company in this city.

PAYETTE, IDAHO.—To take care of its increasing business a new switchboard is being installed by the Independent Telephone Company in this city.

CHAMPAIGN, ILL.—The lines of the Home Telephone Company are being entirely rebuilt in Champaign.

MOLINE, ILL.—Among the many improvements planned by the Union Electric Telephone & Telegraph Company is the construction of a line from Moline to Clinton.

PAXTON, ILL.—The Paxton Telephone & Telegraph Company, which has already expended about six thousand dollars in improving its system, is considering other extensions.

RIDGEFARM, ILL.—A new exchange has recently been installed by the Citizens' Telephone Company at this city and other improvements are being considered.

MICHIGAN CITY, IND.—It is the intention of the Merchants' Mutual Telephone Company to erect a number of rural lines into the country surrounding Michigan City, and to otherwise improve its plant.

PRINCETON, IND.—Many improvements and extensions in its plant are being planned by the Princeton Telephone Company at this city.

IOWA CITY, IA.—The Johnson County Telephone Company is getting ready to construct a copper toll line from Iowa City to Ottumwa by way of Washington.

ABBYVILLE, KAN.—The Pekin Telephone Company is enlarging its plant in Abbyville.

SALINA, KAN.—To accommodate its rapidly increasing business in Solomon, the Salina Telephone Company is to install a new switchboard. Other improvements in its system are also contemplated.

ANN ARBOR, MICH.—It is estimated that in the neighborhood of $25,000 will be spent by the Washtenaw Telephone Company in the extension and improvements of its lines. Among the new lines to be built is one to Detroit.

MARQUETTE, MICH.—The Marquette County Telephone Company, which has recently installed a new switchboard in this city and made many other improvements, expects to follow a similar course in Ishpeming.

SALEM, MICH.—The Home Telephone Company is rebuilding its old lines in West Salem, and is also constructing a number of new lines.

LUVERNE, MINN.—A new switchboard has been installed by the Luverne Telephone Company and many additional improvements in its plant are contemplated.

DILLON, MONT.—The plans for improvements in its service which the Southern Montana Telephone Company has under consideration include the installation of an exchange on the Grasshopper, the converting of its lines into metallic circuits and the construction of a number of new local lines.

PLATTSMOUTH, NEB.—The Plattsmouth Independent Telephone Company, which recently increased its capital stock from $100,000 to $300,000, expects to utilize the increase in the extension and improvement of its plant.

CLINTON, N. Y.—A new rural line is being constructed by the Clinton Telephone Company, and other improvements are being considered.

MONTOUR FALLS, N. Y.—The Montour Falls Telephone Company, which was recently incorporated, is at work on the construction of its lines, which will eventually reach Millport, Odessa, Watkins and other surrounding towns.

RALEIGH, N. C.—The installation of a new switchboard and the stringing of a considerable amount of additional cable are among the improvements being undertaken by the Hickory Telephone Company.

COLUMBIANA, O.—The lines of the Inland Telephone Company are being extended and connections are soon to be established with the Columbiana County Telephone Company at this city.

GREENSBURG, PA.—Arrangements are being made by the Pennsylvania Telephone Company to extend the telephone system which it recently installed to facilitate communication with its yard men.

GALLATIN, TENN.—The Home Telephone Company, of Sumner County, has completed arrangements to enter this city, and in the early future it expects to make connections with the Independent companies in adjoining counties.

PORTLAND, TENN.—The Sumner County Home Telephone Company, which is installing a telephone slystem in Gallatin, expects to establish an exchange at Portland. Connections are to be made with Westmoreland through Bethpage, and many other extensions are contemplated.

WAYNESBORO, TENN.—The Consolidated Telephone Company is constructing a line from Allen's Creek to Waynesboro.

AMARILLO, TEXAS.—A new line from Davenport to Amarillo is being erected by the Davenport Telephone Company.

CHARLESTON, W. VA.—The Charleston Home Telephone Company, which already has twenty-five hundred telephones in service in this city, contemplates the installation of fifteen hundred additional telephones. The number of stations given does not include four hundred and fifty which are handled by the exchanges at Cabin Creek, Montgomery and Clendennin.

PARKERSBURG, W. VA.—The West Virginia Western Telephone Company expects to build a direct circuit between Charleston and Parkersburg at an early date. Connections are also to be established with Pittsburg.

WHEELING, WEST VA.—The plant of the National Telephone Company at this city is being enlarged.

MONTELLO, WIS.—Among the new lines to be built by the Shields Telephone Company is one from Montello to Budsin.

CRANBROOK, B. C., CAN.—The Cranbrook Telephone Company, which has just completed a line between Fernie, B. C., and Cranbrook, a distance of thirty miles, has commenced the construction of a line to Coldstream Valley.

WINNIPEG, MAN., CAN.—A telephone line, 74 miles in length, from Winnipeg to the Point du Bois power plant, is to be erected at once by the Government.

HASTINGS, ONT., CAN.—The lines of the Hastings Telephone Company are being extended to Roslin.

UNDERGROUND.

GADSDEN, ALA.—An ordinance has been passed by the city council of Gadsden compelling all telephone and telegraph companies to place their wires underground in the business section of the city, and work on the removal of the poles is to be commenced at once.

MINNEAPOLIS, MINN.—All telephone wires in the business portion of the city of Minneapolis are to be placed underground at once.

NEW CASTLE, PA.—The Union Telephone Company, which is renewing and improving its entire plant in this city, has applied for additional conduit privileges.

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VOLUME XVI. SATURDAY, NOVEMBER 23, 1907. NUMBER 21.

Rules for Operating Room Employees

A Complete Set of Instructions and Rules for the Government of Local Operating Room Employees.

COMPILED BY KENDALL WEISIGER.

Illustrations from special photographs by John Putnam.

THE present division of this paper opens with a consideration of the duties of operators. As a preface to this, it is logical to define their responsibility. This is covered by the statement that operators are responsible to their supervisor for the giving of satisfactory service to the public, and in order to accomplish this, they must be governed by the rules and instructions laid down for their guidance, obeying without question the instructions of those in charge.

Operators should bear in mind the fact that they have an important mission to perform in rendering telephone service to the public, who will judge the company largely by the service rendered by the individual operator. Operators should therefore be accurate in their work, quick to answer signals, and above all, courteous to the public.

The essential features of good operating may be summed up as follows:

Quick Answers to Clearing Out or Supervisory Signals.—As such may be the result of an inaccurate or otherwise unsatisfactory connection, they should be given immediate attention. In addition to this, it should be remembered that only one operator can answer a supervisory signal, while two or more may reach in and answer a line signal, therefore, supervisory signals should receive the operator's attention ahead of line signals. In answering supervisory signals the best results can be produced by using the prescribed phrases, which are outlined in these instructions.

The Operator, with Her Set Properly Adjusted and Tagged, Ready to Take Her Position.

Quick Answers to Line Signals are expected by the public; slow answers are unsatisfactory and are always a source of complaint. On account of the variation of the load, team work is essential; an operator should not confine herself to answering line signals in her own position, but she should assist by answering any call. **In order that no operator may prevent her neighbor from assisting her, a signal should never be taken up until the operator is fully prepared to answer it.**

Quick Disconnections are next in importance, in order that the subscriber's line may not be kept busy unnecessarily, and that cords and trunks be released as soon as idle. Operators should assist adjacent operators in making disconnections.

Accuracy of Connections.—Without accuracy the subscriber's wants are not fulfilled. To insure accurate connections, the operator must be absolutely sure that she understands correctly the number called for, and that she connects the subscriber with that station, and not with some other station.

Accuracy of Ringing.—False rings not only annoy the subscriber, but they increase the amount of the operator's work. Improper ringing leaves the subscriber in doubt as to whether or not the ring was intended for him, thereby causing a slow answer on his part.

Rapidity of Connection to the Called Subscriber.—Although a subscriber may receive a quick answer and be given a prompt and accurate connection, his wants are not fulfilled until the conversation begins, **and not until then should the operator cease to supervise his connection.**

Absence of "Cut-Offs."—The most annoying interference which can occur in connection with telephone service is a "cut-off," and for this reason extra care must be taken to prevent this occurrence. "Cut-offs" are entirely inexcusable, but if one does occur, the operator must give her first attention to restoring the connection.

Summing Up, it may be said that if an operator speaks distinctly, answers signals promptly and correctly, rings carefully, and attends to all details with care and precision, the service rendered will be highly satisfactory. If she follows the instructions, she will find that she can handle her work with the least effort and at the same time render the most efficient service to the public and to her employers.

¶ In summing up the features of good operating they have been arranged with strict regard to the importance of each, as explained in the text. While the word "quick" has been used at the beginning of the first three items, it is not the writer's intention to give quickness or speed the more important place. In fine, good service may be said to depend on the following: First, courtesy; second, accuracy; third, uniformity (both of operating methods and in speed of answer). Fulfill these requirements with speed and the problem is solved.

EDITOR'S NOTE.—This is an actual set of working instructions for a traffic department. Supplementary notes inserted for the information of telephone men who are not operating experts, or to explain doubtful points, but not properly included in the actual working copy, are contained in paragraphs preceded by the sign (¶). Continued from the issue of November 16.

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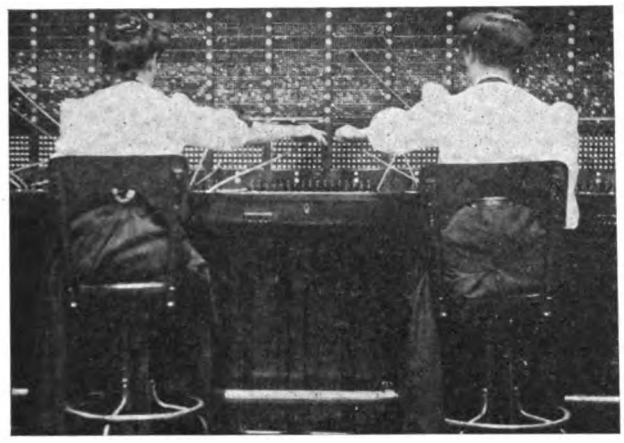
GENERAL INSTRUCTIONS.

Attendance.—Employees must be regular in attendance and must report punctually at the hours assigned them for duty.



Team Work—Two Operators Jointly Covering Unoccupied Position.

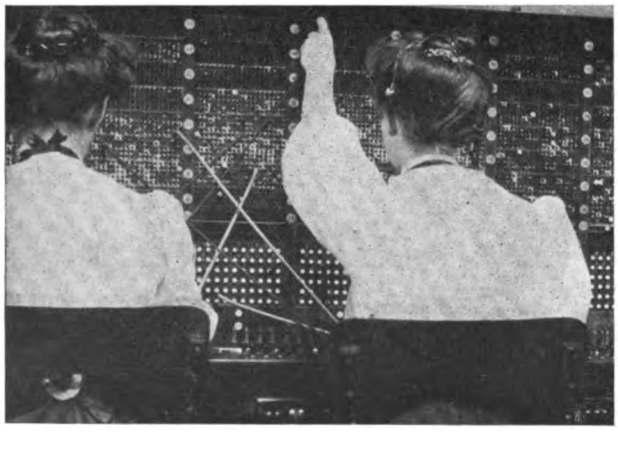
Should an operator be compelled to absent herself from duty, she must notify the chief supervisor, by telephone, giving full explanation of the cause of absence. This must be done before the time that she should report for duty, and she must, as far as possible, furnish definite information as to the time when she will be able to resume her duties.

It may be possible for an operator to be excused, for sufficient reasons, from Sunday or holiday duty, if a satisfactory substitute can be provided.

¶ It has always been a vexatious problem to arrange operating schedules for Sunday and holiday duty, particularly if the force is small. The possibility of being excused from this duty should appear to be extremely remote, hence the wording of the preceding paragraph is arranged to convey this idea.

Change of Address, Etc.—Any change of address or telephone number must be reported immediately to the chief supervisor, and all questions of changes of hours, etc., must be taken up with her.

General Conduct.—Operators must enter and leave the operating room quietly and without conversation, and must avoid boisterous conduct in the retiring rooms, in the neighborhood of the office and in its halls. The practice of congregating or meeting friends at the door of the office is not allowed. Employees should pay especial attention to neatness in personal appearance, and they are requested to dress quietly, avoiding all loud colors.

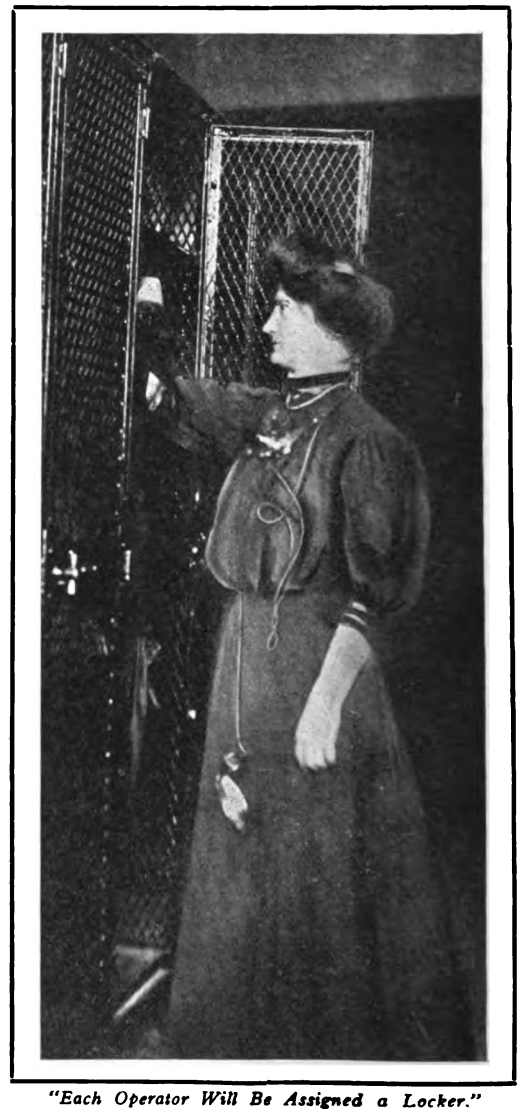


"Operators Should Assist Adjacent Operators in Making Disconnections."

¶ Some operating companies have not only requested their operators to dress quietly, but they have prescribed that they must wear all black clothing or black skirts and white waists in accordance with the season of the year. While this may at first sight appear as an undue hardship, a deeper consideration may show that it is a real benefit to the employees affected.

¶ Aside from the fact that uniformity of dress makes a wonderful improvement in the appearance of a group of employees while on duty, it has more far-reaching advantages both to the employer and employee.

¶ By eliminating the possibility of wearing fancy or elaborate dress, it puts all employees on the same plane, as far as appearance goes, thereby preventing unfavorable comparisons, and to a certain extent it takes the employee's mind from this interesting subject, making it possible for her to devote more thought to the work in hand. Operators thus dressed, when seen in the neighborhood of the building going to and from work, are likely to favorably impress the public mind as to their character and business-like intentions. By actual count it will be found that even where such regulations are not formally stated a larger percentage of operators, especially the older ones, wear sensible combinations which befit the young woman of business.



"Each Operator Will Be Assigned a Locker."

Mail and Packages.— In so far as it is possible for employees to control the matter, they must see that personal mail, packages, etc., are delivered at their home addresses and not in the care of the company.

Manner of Addressing Other Employees.—While on duty, all operating room employees will address each other by their surnames, using the proper prefix.

¶ The reverse of this practice tends to weaken the discipline of the force and is therefore to be avoided.

Lockers.—In certain exchanges each operator will be assigned to a locker and she will be held responsible for its cleanliness. She will be furnished with a key to the locker, for which she will also be held responsible. Operators will be charged at the rate of twenty-five cents for each key lost or not returned when required.

¶ The matter of locker keys is another one of the many petty annoyances to be met and dealt with by the operating department. It has been thought desirable to impose a fine for the loss of a key as a precautionary measure rather than to actually cover the cost of the key. Blanks can be secured and duplicate keys made by the maintenance force at a small cost. The dif-

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ference between the cost and the price of these replaced keys may be applied to the purchase of little conveninces for the retiring room.

Care of Telephone Sets.—Upon entering the service each operator will be provided with a telephone set for her individual use. Each set is numbered and each operator will be held responsible for the set which is charged to her. The set must be adjusted in the retiring room and must be left in the locker when not in use.

¶ Various devices have been planned for marking for identification the operator's telephone sets. One of the most satisfactory is to stamp the number on a small aluminum tag, which can be fastened to the set by means of a very small split ring.

Use of Telephone Sets.—The transmitter should be so adjusted that the mouthpiece will be within half an inch of the lips. Operators will speak in a distinct tone into the mouthpiece. The receiver must be retained at the ear continuously while at the switchboard.

Operator's Number.—A personal number will be assigned to each operator, for her use in dealing with the company. Operators are prohibited from giving their names or numbers to any subscriber. In every instance where the name or number is requested, the operator should connect the subscriber with her supervisor.

¶ Most companies instruct their operators to give the number to any one who requests the name. There are generally two reasons why an operator's name is requested; one is that the subscriber wishes to complain of the operator, and the other is that he wishes to send her a present. In the first case it is more desirable to have the supervisor get the facts in the case and possibly appease the complaining subscriber, than to have him make a letter complaint, which will come in a few days later, when it will be difficult to get the actual facts. In this way the supervisor will be able to anticipate possible complaints, and being behind the operator, she will be able to ascertain whether the fault is with the operator or the equipment. In the second case the subscriber should be told to place the operator's number on his present and it will reach the person who answers his line.

Care of Switchboard.—Operators will keep the keyboard in a neat and tidy condition. The use of water, confectionery, chewing gum, fruit, books, etc., while operators are on duty, is forbidden; the switchboard must be kept free from everything not required by the service. Pencils must never be sharpened at the switchboard.

Each operator is held responsible for the condition of her position, and any trouble found in it or with the subscribers' lines terminating in it, must be reported to the supervisor at once.

¶ If operators are made to feel responsible for the condition of their positions they will take pains to report troubles occurring in them. Operators who from nervousness or other causes get in the habit of unscrewing cam lever handles, marking on the apparatus, etc., should not be kept at the switchboard while they continue such practices.

(*To be Continued.*)

BOSTON AND ALBANY RAILROAD WORKING NEW COPPER CIRCUITS AT FULL CAPACITY.

BOTH telephone and telegraph instruments are to be used over two new copper circuits completed between Albany and Boston along the line of the Boston & Albany Railway. Arrangements have been made for cutting in Morse apparatus, so as to form simplex and composite telegraph circuits on these lines, with stations at Boston, Springfield and Albany. Plans are worked out so that the railway company can make from its wires, by well-known methods, three telephone circuits and two telegraph, or two telephone circuits and four telegraph circuits, as daily requirements may demand.

CITY STARTS TO STRING ELECTRIC LIGHT WIRES ON HOME TELEPHONE COMPANY'S POLES IN FORT WAYNE.

WITH a view, it is said, of forcing the issue existing between the Home Telephone & Telegraph Company, of Fort Wayne, and the city officials, the latter on the morning of Wednesday, November the 13th, instructed the McBride Construction Company to proceed with the stringing of electric light wires on the company's poles. This action was met by the company with a written protest, and notice that the company would hold the city liable for any damage inflicted upon its system, its employees or its service by the stringing on its poles of wires carrying a dangerous or disturbing current. After wires had been put up on a score or more of poles the city ordered the work stopped.

Simultaneous Telephony and Telegraphy Over One Grounded Wire

By N. C. Kissell.

THE "telegraphone" or "railway composite" circuit consists of a grounded telegraph line over which speech may be transmitted between telephone instruments at the same time "Morse" signals are going over the wire. It is not as quiet for telephone purposes as a metallic circuit but does very well for moderate distances. Its great advantage lies in the fact that existing telegraph lines running between stations or blocks can be used for telephone circuits without any changes in the lines themselves. All trains are equipped with a portable telephone set, and if anything happens between stations or blocks, the train crew can get in instant communication with the nearest office and receive orders. This is done by hooking the set on to a wire which is composited (and known to the crew) by means of a line pole. A work train while in between blocks or stations can, by putting its set on the line, be in communication with the nearest telegraph office and carry on its work without fear of any danger, as the offices ahead and behind can call up the train and order it out in case of an approaching train.

Signaling of telephone instruments is accomplished through the agency of an alternating current of very high frequency which does not interfere with the telegraph instruments. The circuit of the telephone is of the ordinary local battery type, with the exception of the induction coil. This is provided with an armature which makes and breaks the circuit in the primary of the coil, thereby inducing an alternating current of high frequency in the secondary. This induction coil is used in signaling by pressing down a special button, but during conversation it is used simply as an ordinary telephone induction coil.

Perhaps the easiest way to describe in detail the operation of a line equipped with this apparatus is to first take up the "Morse" circuit and its action. This is shown in Fig. 1, from which all the circuits of the telephone and the locals of the Morse relays are omitted for the sake of simplicity.

Between the line and the instruments at each end is placed an impedance coil, with a grounded condenser between this and the instrument, as shown. The coil is placed in series with the line and consists of an iron core wound with many turns of insulated wire to a resistance of 50 ohms. Its ohmic resistance is low, but being wound with many turns of wire it offers a very high impedance to high frequency alternating currents

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The condenser has a capacity of 1 M F. The operation of this circuit may be traced by supposing a typical case, where *A* is sending to *D*. Current starting from battery at *A* passes through the telegraph instrument to the condenser, where it suffers a delay on account of the condenser having the property of absorbing a certain amount of electricity, and this amount must flow before the current passes on. From here it passes to the first 50 ohm coil where it also suffers another delay on account of the magnetic properties of the coil. When the current rises in this coil a counter E. M. F. is induced in it in the opposite direction to the inducing current, because as the magnetic lines of force in the iron core increase they in turn cut all the turns of wire on it, thereby inducing an E. M. F. which is opposite in direction to that which is causing the lines of force to increase. The current passes on to station *B*, and goes through the relay at this point, direct current being unable to pass through a condenser. Passing on, it goes through station *C* to *D*, passing through the relay at this station to battery, thence to ground and returns to *A*. At *D* it also encounters a coil and condenser as at *A*, thereby slowing down the "Morse" wave, or in other words rounding off the edges of the sharp "Morse" impulses. This action is exactly what is found in an ordinary grounded telegraph line, with the exception that in the present circuit there have been introduced inductance (the magnetic coil), and capacity (the condenser) to round off the corners of the "Morse" impulses, as is necessary on account of the telephone instruments. At stations *B* and *C*, the 150 ohm "Morse" relay is bridged with a 1000 ohm non-inductive resistance. This

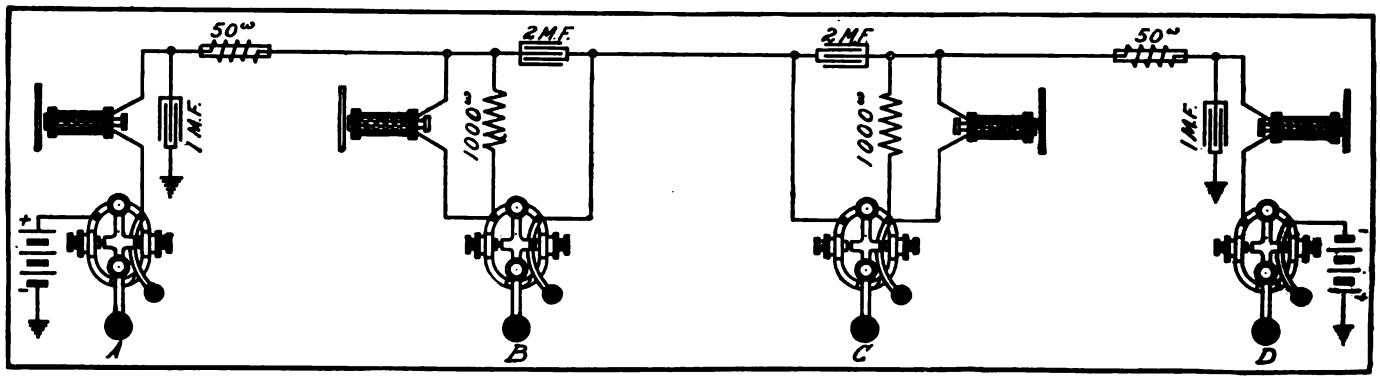

Fig. 1. The elements of the "telegraphone," or "railway composite" circuit, which are concerned in the transmission of telegraphic signals.

will offer a shunt path for the telegraph current around the telegraph relay. With sufficient battery at *A* and *D*, this will not affect the relay materially and its object is different from that of a mere shunt. It offers a non-inductive path for the discharge or "kick" of the relay upon opening the key, thereby shunting out most of this kick from passing through the telephone to ground. The condensers bridged across the instruments at *B* and *C* serve the purpose of keeping the talking line closed when either key is opened.

(To be continued.)

INDEPENDENT DISTRICT ASSOCIATION MEETINGS IN INDIANA.

MEMBERS of the eleventh and fifth districts, respectively, have recently held meetings in Indiana. At the meeting of the eleventh district, held at Seymour, Vice President W. H. McPherson was in the chair. Many good points were brought out in papers and discussions. Mr. John L. Hosea, manager of the Citizens' Telephone Company, of Columbus, in responding to the subject, "Rural Construction," advocated the advisability of building lines substantially, so that they would be a permanent asset, and not liable to constant expense for repairs or renewals. This plan is far better, he said, than to construct a "hurry-up line" for immediate revenue. C. E. Brown, of the Brownstown Telephone Company, gave "Unprofitable Business" a few hard knocks, and had some good words for the plan of charging adequate rates, and cutting out all free toll business.

The organization selected as its delegates to the International Convention to be held in Chicago next January, W. H. McPherson and C. M. Bowers.

The meeting of the fifth district was held at Winchester, and Vice President J. A. Brown was in the chair. This meeting was opened by Mr. A. C. Lindemuth, president of the Richmond Home Telephone Company, and of the Indiana State Association. He spoke of the importance of district associations cooperating with the State organization. Mr. T. O. O'Rourke, of the Delaware and Madison Counties Telephone Company, spoke against the short-sighted policy of carrying slow collections on the books, and of employing unskilled labor. He also urged that rural lines be not extended too far away from the exchange at low rates, as the cost of repairs increases greatly with the distance, and instead of becoming a source of revenue they are liable to become a drain on the system. The possibility of future development, of course, must be borne in mind, but unless this offers a chance for ultimate profit the line should not be built at low rates. Mr. C. S. Norton, of Indianapolis, spoke strongly and in an informing manner upon the subject of the "Cost of Operating." He urged that a company should have a definite and comprehensive system of bookkeeping, so that it should be able to discover at a glance the source from whence its income is derived, and the items which are the cause of the greatest expense. "Income," he said, "falls under three heads, namely Exchange Rentals, Toll Line Rentals and Miscellaneous Earnings; while expense may be divided into five heads, namely, General, Operating, Maintenance, Fixed Charges and Surplus. A definite percentage of the earning should be set aside for each of the divisions, and the expenses held rigidly within those limitations." Mr. Norton suggested the following ratios for exchanges ranging from 500 to 3,000 subscribers: General, 20 to 25 per cent.; operating, 25 to 30 per cent.; maintenance, 15 to 20 per cent.; fixed charges, 15 per cent., and surplus, 15 to 25 per cent.

The delegates selected from the fifth district to attend the International Convention are, Frank White, Portland, and T. O. O'Rourke, of Muncie. The representatives and visitors attending the meeting were handsomely entertained by the Eastern Indiana Telephone Company, of Winchester. The success of these meetings and the excellent reports of the growth and progress of the Independent companies of Indiana were so gratifying that a resolution was unanimously adopted commending the policy and work of the officials of the State Association.

POSSIBILITY OF COMPETITION AT BELL HEADQUARTERS IN OKLAHOMA.

FOR some time past it is understood that the Pioneer Telephone & Telegraph Company, operating the Bell plant in Oklahoma City, Okla., has been giving poor service. In spite of the fact that a new switchboard is being installed, the people do not seem to be disposed to wait longer for an improvement, and are taking steps to push the installation of an Independent system. A motion for a franchise was recently passed as its first reading, and referred to a special committee of three for further consideration.

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Things the Troubleman Can Tell

By C. C. Kingsley, Troubleman.

THE reader of technical journals finds that nearly all articles which are published come from men who are heads of departments, engineers, or hold other positions of responsibility in the organizations of which they are members. It is safe to believe that the immediate reason why this condition is true is because these men write the best articles that are sent to the editors. But to get at the bottom of the thing one has to dig a little deeper than this. If a man wants to know how certain work is done, why is it that he cannot find an article written by a man who puts in all his time on the job? He ought to know how the work is done, for he is using his head and his hands on one job after another, all day and every day, doing just one particular kind of work.

One of the first answers a man makes to such a question is that the people who are doing the actual work of putting things together have not a good general education. This is not true. Often they have had more advantages of schooling, or are better posted on general subjects than the persons from whom they take orders. Perhaps the reason why the acceptable articles are written by the people in authority is because the persons who have no special responsibilities have not the same amount of interest in the work after the set working period of the day is over. Again, the person who does much of his work with tools, directly on the equipment, may think his literary efforts would not be appreciated by the publishers or the readers generally.

But to come right to the point, do these things show any real reason why a man who sets anchors by the dozen should not be better able to tell how the job should be done than someone who gets most of his knowledge of this kind of work from a book, and what other people tell him a bit at a time? After all, writing an article is not much more than telling the truth, the whole truth and nothing but the truth. Any troubleman would be angry if you told him he was not able to do that, and if a man actually does do it about some piece of his work he will have something that will surely be useful, and it stands more than an even chance of being readable for the way it is worded.

Some of the men who work in a telephone exchange and are successful in a small way like to talk as if they thought theoretical knowledge was of no use to a practical man. But if they want to give the matter a serious thought they will convince themselves right away that at the proper time theory is something the business cannot get along without. All they have to do is to ask themselves why we have such great telephone systems operating so smoothly to-day. The answer is, because they were first figured out on paper. Instead of finding fault with theory because it has not produced perfect apparatus the troubleman can show where a little more theory needs to be applied, in order to make things that will behave as they should. If he can get the theoretical knowledge, let him apply it himself, and profit by it. The advice of the great electrician, Prof. Joseph Henry, to the man who invented the telephone ought to be an inspiration to every telephone man now. He heard Prof. Bell's complaint that although he had a good knowledge of the theory of sound he did not have the understanding of electricity to combine with it, so that he could make his experiments a success. "Get it" were the brief words of advice which set him to work on studies which brought him fame.

A great handicap to some telephone men is the habit of finding fault with their superiors. Investigation will reveal the fact that these men as a rule are workmen of inferior ability.

The writer's own observation of his associates who do the same kind of work has made it clear to him that a successful troubleman is conscientious, thoroughly understands the work which he is called upon to inspect, and has a general understanding and appreciation of human nature. This last may seem an odd statement, but in certain cases of trouble a man has to depend a great deal on what the subscriber tells him, and many a subscriber does not hesitate to exaggerate the trouble. Especially is this likely to be true of a subscriber who has had trouble with the cashier's office within a few days.

Inspectors ought not to lose patience if after a hard day's work the manager or some one in authority says, "Too much trouble carried over to-night," because this man wouldn't be manager if he didn't say something of this sort when his judgment shows it is necessary. If the wire chief or chief inspector finds fault unjustly the inspector should not place himself on unpleasant terms with the man who directs his work by taking exception to his remarks in an ill-natured spirit.

In any successful maintenance department the most essential thing is the system of handling work. Perhaps all the most common and most practical systems put a wire chief in charge of the movements of the men. In order to merit and receive the confidence of the men a wire chief must be an accurate tester, so that when an inspector goes after a case of trouble he can depend on the test given him by his chief. A good wire chief also has a thorough understanding of instruments and line construction in all branches.

In handling his end of the work the inspector finds that it pays to reduce the number of his calls to the wire chief to a minimum. He gets ready for a test before calling. If possible he calls over a line not being tested. If he can think of any way to save the wire chief's time he does it. That is, an inspector who knows his business does. Some don't know their business. The writer knows of cases where a troubleman called the wire chief for each line when several were being tested at the same time and at the same place.

There are numerous articles available treating of methods of clearing trouble, but if a book were written on "trouble to clear" or some similar title it would be a large one if it covered all cases. Every troubleman finds that there are new causes occurring every day. That this is true the writer knows from his own actual experience, and other inspectors with whom he comes in contact say the same. Of course, the average construction man thinks the job of shooting trouble a snap, and that anyone can do it. Of course anyone can do it, after a fashion; but a man's ability to clear trouble depends upon his knowing where to look for it. Clearing trouble, after all, means a great deal of guess work, that is, guessing where the trouble is. This means that the man who usually guesses right can frequently make his very first test verify his conclusion, and thus save time. When the trouble is once located a good man clears it so it will not occur again.

Construction men are not to be too much trusted on features affecting the work of a maintenance department. The writer knows a man, now city foreman of an exchange of three or four thousand subscribers, who said some time ago that he thought it foolish for a company to buy solder to solder jumper wires to a line. His argument was that he knew of an old rusty wire which was grounded and making contact with one side of a line gave a perfect ground through the rust. The writer is inclined to think that if he is practicing this theory now they have some noisy lines in a certain city in Central Illinois.

If troublemen will only get the idea that they can do the other fellows in the business good, and help themselves by writing out articles about what they find and how they clear it, a good many of them may find that, after all, they can show that they know as much about their own branch of the business as the engineers. The inspectors who get where they can do this and succeed in their jobs, too, will probably be the men who carry out the following principles: To get the trouble the first time; to have courage enough to ask questions of superiors; to realize, if the wire chief is irritable, that he has his off days; to refrain from getting angry if the manager appears unreasonable; and above all, to do always what seems to be the square thing.

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In the Operating Field

TEXAS COUNTY COMMISSIONERS NOT ENTITLED TO FREE TELEPHONES.

THE Attorney General's Department of the State of Texas has made a ruling upon that provision of the anti-pass law passed by the thirtieth legislature, providing that telephone and other companies shall establish uniform rates. The department holds that it is contrary to the provisions of the law for telephone companies to furnish telephones free to the commissioners' courts in consideration of privileges granted in the matter of the use of the public highways; and that they cannot properly continue to furnish telephones to such bodies at reduced rates in consideration of such privileges, where such arrangement has been in effect.

INDEPENDENT MANAGERS IN INDIANA HOLD MEETING TO DISCUSS CLEARING-HOUSE FOR TOLL CHARGES.

A MEETING was held in Vincennes, Ind., on the 29th ult., at which were present C. H. Weed, Vincennes, manager of the Pike County Telephone Company; E. H. Jenne and F. R. Barrett, Princeton Telephone Company; H. W. Shaw, Davies County Home Telephone Company, Washington; H. B. Candle, Knox County Home Telephone Company, Vincennes; William H. Harbaugh, Sullivan Telephone Company; J. W. Coffey, New Long Distance Telephone Company, Indianapolis, and others. A plan of adjusting and making uniform rates over local toll lines was discussed. Heretofore each company in this territory has made its own rates and kept all charges collected. It is now proposed to prepare a blue print draft showing the exact routing, number of lines owned by all connections, that uniform rates be established and the charges divided on a mileage basis. This will facilitate handling tolls and secure to each company its equitable proportion of the business handled.

UNITED STATES NAVY EQUIPS MANY SHIPS WITH WIRELESS TELEPHONE APPARATUS.

IT is reported by the Radio Telephone Company that the United States Navy has just ordered twenty-eight sets of wireless telephone apparatus to be installed on that number of battleships and cruisers. Eleven of the ships to be so equipped are understood to be in the Pacific Ocean at the present time, and the balance, which are on the Atlantic, form a portion of the fleet which will be under the command of Admiral Evans on the coming cruise into Pacific waters. Arrangements are being made for the equipment of the ships before they sail on December 15th. It is understood that the decision to equip the ships in this manner is the result of recent demonstrations of this system of wireless telephony conducted by Dr. Lee De Forest on board the battleships Connecticut and Virginia. He states that during these tests words and music were clearly heard on board the Kentucky and Tennessee, eleven miles from the transmitting station, and on one occasion over a distance of twenty-five miles.

COMPELLING A COMPANY TO GIVE BETTER SERVICE.

AT Fort Smith, Arkansas, Chancellor Bourland has granted an injunction against the Southwestern Telegraph and Telephone Company, preventing it from collecting from subscribers until service is improved and holding that the company would be in contempt of court unless great improvement was shown by November 1.

The decision was rendered in the case of Joe Johnson and other subscribers against the company, and the court was asked to declare the present service a nuisance and oust the company from the city, unless the service is improved. Early in his opinion Chancellor Bourland stated he had no doubt about the violation of the contract and the right of the court to afford relief, but that the awkward point was the forming of a decree that would give the petitioners the relief they desired and at the same time not be unjust to the company. The franchise originally granted the company expired in 1895, but the court holds the council has recognized the company since that time, and it has a right to do business.

ELECTRIC COMPANY SUED FOR DAMAGES TO TELEPHONE SWITCHBOARD.

AT Lake Charles, Louisiana, a suit for damages has been filed by the Cumberland Telephone and Telegraph Company against the Jennings Electric Light and Power Company to recover for losses sustained by the burning of the telephone exchange in Jennings about a year ago.

The telephone company alleges in its petition that the fire in its exchange was caused by a live wire belonging to the electric light company coming in contact with one of the telephone wires, with the result that all of the 400 drops in the exchange were burned out, the switchboard ruined and many of the wires rendered useless. It claims damages to the amount of $1,295.70, charging that the contact of the wires was due to negligence on the part of the employes of the electric light company in removing some of the electric light poles, which allowed the electric light company's wire to drop on the telephone wire.

BUSINESS MEN IN WILLIAMSTON, S. C., DO NOT THINK THEY ARE BEING TREATED FAIRLY.

PREVIOUS to the purchasing of the local plant at Williamston, S. C., by the Bell Company the business men were allowed free connection with the city of Anderson, but since the purchase this arrangement has been discontinued. Business men have recently circulated a petition which was sent to the Anderson Chamber of Commerce and later turned that over to the railroad commission, praying that the old conditions be re-established.

COMPETITION BRINGS SUDDEN HEAVY REDUCTION IN BELL RATES AT OMAHA.

WHEN a telephone company reduces its rates this year, at a time when nearly everybody is looking for a chance to raise them, it makes people ask questions. The question that telephone users in the city of Omaha are asking just now is why they did not have competition long ago. The Independent company is about ready to cut over its new plant, work upon which has been rushed for some months past, and the Bell company, anticipating, apparently, the effect of the keen competition which will be inaugurated, expects to drop its rates materially. The new charges on direct lines will be $72 for business and $42 for residence instruments, in place of $84 and $54. For two-party lines the new schedule provides rates of $54 and $36. In Omaha the rates have been dropped $6 to $12 per year on different classes of service, and $4 to $6 per year in the neighboring city of South Omaha. The five-cent toll charge that has previously been charged between the two cities will be cut out, giving free service, although this concession will in part be compensated by a certain readjustment of rates. Talk of these unusual proceedings is heard everywhere in the city, and there seem to be three classes of interested persons in Omaha. Subscribers to the Bell service are jubilant over the reduction which they will receive to help pay for the Independent service; the people who voted for the Independent company, in the belief that it would bring down rates, now see their actions justified; and finally the local stockholders of the Bell company are wondering where they come in!

NEBRASKA ASSOCIATION DENIES SUPPORT TO WESTERN ELECTRIC EXTENSION POLICY.

THE executive committee of the Nebraska Independent Telephone Association at a recent meeting passed unanimously a resolution stating that:

"Whereas the Western Electric Company, at the dictation of the American Telephone & Telegraph Company, now offers to sell its wares outright to Independent companies, if press re-

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ports may be believed, with the object of gaining a footing with said companies, so as to materially assist the American Telephone and Telegraph Company in disrupting the spirit of co-operation that exists, it is resolved that the members of the Nebraska Independent Telephone Association are requested not to purchase or use, nor to connect with any company that uses telephones, switchboards or equipment made by the Western Electric Company."

ANOTHER REMARKABLE TROUBLE ON TELEPHONE LINES BESIDE A RAILWAY.

THERE is at least one locality where the physical equipments of telephone and railway companies seem to be at war. Not far from the place of the accident described in a recent issue of THE AMERICAN TELEPHONE JOURNAL an accident occurred on the railway which caused a flat car and a box car to be forced together. Instead of both cars smashing, the ends which came together rose in the air and formed a letter A, which toppled over on the telephone company's pole, and carried it down with all its wires. The telephone company had to run emergency cable to take care of its lines until the cars could be lifted back upon the track and a new pole set.

ROCK ISLAND RAILWAY INSTALLS TELEPHONE SYSTEM AT PEORIA.

EMPLOYEES of the Rock Island Railway Co. are expressing their satisfaction at a new improvement, consisting of the installation of a branch exchange in the extensive yards at Peoria, Ill. All the yard offices, freight offices and station departments will be connected with a switchboard, where an operator will be placed, who will handle the local business and make connections with the central office. It is thought that this will greatly facilitate the handling of the railway company's business, and save a great deal of valuable time for its employees and the public.

INDEPENDENT COMPANIES CONSTANTLY INCREASING STRENGTH IN MICHIGAN.

ONE of the most interesting features of the telephone business in Michigan at present is the spectacle of the small private telephone companies, some of which have been connected to Bell lines, selling out to the larger Independent companies or making some arrangements for permanent connection of their lines with the network of Independent lines scattered over Michigan.

The Grawn Rural Telephone Company last week decided to cut loose from the Bell Telephone Company and go with the Independents. A meeting was held at Monroe Center, and it was unanimously voted to reorganize under the name of the Grawn Independent Telephone Company, the change to take place at the expiration of their contract with the Bell people. The company will now go into territory which the Bell company did not reach, and by May 1 will have 200 telephones against 100 now. It will reach Wexford and Buckley exchanges, and a new line is to be built to Traverse City. The officers of the new company are: President, Chas. B. Dye, Traverse City; vice-president, L. A. Moyer, Monroe Center; secretary, Malcolm Hargraves, Monroe Center, and general manager, Fred E. Hill, Grawn.

The Independent companies have never been able to obtain a foothold in Kalamazoo, but it looks now as if they might. Parties whose names have not yet been made public have incorporated a $500,000 company and propose to make a bid for a local franchise. The Bell company has had a monopoly of this field, but it looks as if the time were ripe for the Independents.

The Independent companies have also been shut out of Mt. Clemens, but the Home Telephone Company of Detroit, which was turned down in its first application for a franchise, has now made another offer to the council, suggesting more liberal terms, and is likely to win out.

KANSAS INDEPENDENTS TO HOLD CONVENTION DECEMBER 11TH AND 12TH.

ANNOUNCEMENT has been made by W. H. Nelson, president, and W. P. Hemphill, secretary, of the Kansas Independent Association, that the annual convention will be held at the Hotel Throop, Topeka, on December 11th and 12th. An excellent program is being arranged, and the important matters affecting the business and development of the Independent telephone companies will make this an exceptionally interesting and useful meeting. Every Independent telephone man in the State is urged to attend this convention, and take with him those of his friends who may be interested in the telephone business.

NEW TELEPHONE SYSTEM LIKELY TO RESULT FROM BELL RAISING OF RATES IN OKLAHOMA.

THE Pioneer Telephone & Telegraph Company, which operates in Oklahoma, and claims in some places to be Independent, and in others admits that it is a Bell company, is just now in a very undesirable position in the town of Enid. The reason for this is a raise in rates for residence telephones from $1.50 to $2.00 per month, and from $2.00 to $3.00 for business telephones. The people think that this raise is a little bit too heavy an increase in price, and believe they can obtain better and cheaper service from an Independent telephone company. Steps are being taken to secure a franchise, and raise money for the building of a new telephone system. So intense is the feeling against the Bell company that signs have been placed all over the city bearing sentences like the following: "When the phone rate goes up the Pioneer goes out" and "Down with the grafters, we'll make them be decent." A number of the most prominent people in town are behind the movement.

ITHACA TELEPHONE COMPANY.

Ithaca, N. Y., Sept. 4, 1907.

American Telephone Journal,
New York, N. Y.

Gentlemen:—

On looking over your last issue of the JOURNAL *we could not help but notice the marked interest your readers are taking in it, by sending in queries and diagrams and asking questions, etc. We certainly look forward with great pleasure to Saturday afternoon when the* JOURNAL *arrives in our town, as we believe there is more good sound telephone talk and good pointers in this paper than any other of its kind published to-day.*

What has been worrying me, is when we pass from this world and go to the world beyond, will you still forward to faithful subscribers copies of the JOURNAL? *We presume you will have to have asbestos paper at that time, as we think that is the only substance that will survive the climate where any person who has followed the telephone business for any length of time is bound to reside.*

With best regards, I am,

Very truly yours,

R. B. FEGAN,
MANAGER.

One of the many good points of the JOURNAL*—as an inconvenience alleviator in the hereafter!*

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As Things Look to the Editor

ECONOMICAL DISTRIBUTION AND THE PERSONAL INFLUENCE OF SUBSCRIBERS.

GETTING subscribers for telephone service very often used to be carried on somewhat on the endless chain plan. As soon as a man had a telephone put in his residence he was asked to give the names of friends with whom he would like to be able to talk over the wire. The information thus obtained was used in various subtle ways, depending on the persuasive abilities of the telephone company's agent, to bring new patrons into the fold. Soliciting telephone business was in those times not wholly unlike the job of a book canvasser, who spares no efforts to get the names of persons with social and business influence at the head of his list when he enters a new field. Similarly the solicitor of telephone contracts was in the habit of posting himself on the membership and make-up of the various large and small cliques which exist in nearly all places. Once the leader in each group was connected there was little difficulty experienced in swinging the rest into line.

This plan worked very well for the telephone company operating in a town where the social groups were more or less built on neighborhood lines. Up to a few years ago there were, in fact, many influences at work which made this condition a prevalent one. Close acquaintance between persons living rather far apart was not especially likely to develop, because of the very inconveniences of communication, and so when a family spoke of its near friends the phrase might be construed in a very literal sense. To-day, after some years of familiarity with methods of communication which are easily employed at small cost, including the bicycle, electric railways, automobiles, and, not the least of all, the telephone itself, the social connections of the average family are to a wide degree freed from the limitations formerly imposed by distance. The result is that the canvasser for new telephone subscribers who attempts to work the endless chain idea finds that he must be not merely a good talker, but also a good traveler. Also, he will be especially fortunate if he keeps out of altercations with the department which has to assign the wires for giving service after the contract is taken, and is prone to talk of the folly of agreeing to give a man service ahead of the development of the plant in his neighborhood.

The frequency with which the report of "No conductors" was made in the old days, still not so very far distant, and the evil consequences of such reports, are familiar to nearly every telephone man. They resulted in discontent and lack of respect for one another among the employees of the different departments, and bred a spirit of unwillingness to co-operate, which was far from being a good thing for the telephone company. These faults are in a large measure avoided by the modern plan of basing all attempts to obtain new business upon a development study, carefully worked out on a scientific basis far in advance of the time when the solicitor of contracts appears upon the scene. With the knowledge that it really is possible for persons who know how to go about the work to make, in general, fairly accurate estimates of the number of people likely to be able to use telephone service for a given period in the future, the number of wires they will require under a proper apportionment of direct and party lines, the lay-out and construction of the plant can go ahead as a whole, with the knowledge that the work is warranted by a well founded estimate of future business possibilities. Under these conditions the work of the solicitor of new business in a given district may, from one point of view, be considered to be that of obtaining terminal facilities required to complete the physical system laid out by the company. The contract man, instead of exerting his influence to nag the engineering and construction departments to follow as rapidly as possible in his tracks, makes his detailed knowledge available in the first place, and co-operates in acquiring for the company a plant which will be fit and ready when he needs it.

In this way friction is eliminated, and time and money are saved. The work of the contract department is based on general business conditions. In dealing with a district as a unit, instead of a group of isolated individuals, the contract man broadens his work, making it at the same time easier and more effective. Without neglecting or undervaluing the importance of the influence of the subscribers among their acquaintances, he in a measure stores up such influences, making them available collectively when they will be most useful. In this way he is able to co-operate with the other departments to bring about the highest economy, construction being done in an orderly fashion.

SWAPPING COSTS.

INDEPENDENT telephone men see where the coming convention at Chicago, in January, is going to be exceptionally useful to them. For one thing, they will have a better opportunity than ever before, on account of the holding of the convention in connection with the Chicago Electrical Show, to observe under the best conditions the high state of development attained by the manufacturing branch of the industry. This will focus the attention of operating men more closely than at any previous convention upon the most direct usefulness of the meeting to their respective companies in a business way. They will be keenly on the look-out for opportunities to improve the character of their plants by availing themselves of the most important new inventions, and will be prompt to make investigations which will reveal the comparative merits of such devices as may be designed for accomplishing similar purposes. They are likely this year, too, on account of a tendency in the business which is becoming more and more evident, to devote an especial amount of attention to branches of operating economics which are not so intimately related to the purchase of manufactured equipment.

For the past year or more throughout the country an exceptional amount of thought has been expended upon questions affecting the economical production and profitable marketing of telephone service. The raising of rates, and specialization of efforts to secure the highest grades of subscribers in all parts of the country, by both Bell and Independent companies, are some of the results of this line of effort which are apparent on the surface. Still, it is fair to say that many telephone men are not wholly satisfied with the results they are obtaining. The detailed investigations they have made of the conditions revealed by an examination of data accumulated through their now plentiful years of experience have perhaps been more useful as a means of indicating a general line of procedure than in affording absolutely definite suggestions for the profitable conduct of the business. There are so many items entering into the question of rate making, and cost limitations, that there are few men who cannot profit by learning what is being done by their associates.

The coming convention offers an opportunity for conferences, formal and informal, which may be productive of much good along these lines. The value of any discussion to those who take part in it depends absolutely upon the extent to which the men who participate have made preparation. A conference on costs is of no value whatever unless it brings out definite and reliable figures and the relation of dollars of income and expenditure to the physical characteristics of the plant. This means that the men who are going back home with clearer ideas of how to make their equipment and staffs produce better returns on their investment and current expenditures will be those who are able to make, on the spot, comparisons of actual figures. The men, for example, who have reconstructed their plants, substituting cable for open wire, will have a chance to compare notes on the saving in maintenance expense. The managers will bear in mind that no comparison can be made unless each has his figures with him. Those who are on hand ready to exchange real information about their own plants for similar facts about their neighbors' systems will go home with a broader knowledge of the business, which will make their trip to Chicago the best investment of time and money for the year.

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Telephone Cases and Decisions

CONDUCTED BY A. H. MCMILLAN.

USE OF HIGHWAYS IN ILLINOIS.

Will you please tell us what rights telephone companies have to the highways of Illinois, and from whom such rights are to be obtained? We are particularly anxious to know what the power of the highway commissioners is, as we have been having some difficulty with these individuals in getting them to let us use the highway. H. B. C.

YOU should have no difficulty with the Highway Commissioners of your State, as their duty is plainly pointed out by the statute. A telephone company is authorized to construct, maintain, alter and extend its poles, wires, cables, and other appliances along, upon, under and across any highway, street, alley, water or public grounds in the State, but not so as to incommode the public in the use thereof. It is provided, however, that the statute shall not interfere with the control already vested in cities, incorporated towns and villages in relation to the regulation of poles and other appliances mentioned. Before proceeding with its construction, the company must give the Highway Commissioner having jurisdiction and control over the road, notice in writing of its purpose and intention, at least ten days before it does the work. Upon the company giving notice, it is the duty of the commissioners to specify the portion of the road in which the line is to be placed, and the company must so build. If the Commissioners do not specify in ten days, the company may locate its lines as it pleases, but not so as to interfere with the proper use of the highway. Laws of 1903, Act of May 16, Sec. 14. You will thus see your proper course is to give notice to the Commissioners that you intend to build and ask them to specify the portion of the highway upon which you are to locate your line. If they do not comply with your request in ten days, you may then locate your line to please yourself.

INTERFERENCE WITH TELEPHONE LINES A FELONY IN MISSOURI.

IT has been held by the Kansas City Court of Appeals that the law of Missouri, making the unlawful interference with telephone lines a misdemeanor, was repealed by the Act of 1901, including telephone companies in the provision of the Act of 1891, under which the malicious injury of lines of telegraph companies was made a felony. Rev. St. 1899, Sec. 1261, Laws 1901, Page 129, Rev. St. 1891, Sec. 1957.

Two men were tried and convicted for cutting wires of a telephone line, known as the "Farmers' Bolivar & Vann Telephone Company." The defendants were in the employ of a telephone company above the lines of which the farmers' company had stretched their wires. The excuse given by the defendants was that the wires of the farmers' line would soon become detached from the poles and fall across the lower wires so as to interfere with the service of the defendants' company, and its patrons. The court held this was no excuse, but reversed the judgment for the reason that the defendants were prosecuted under the statute against the commission of misdemeanors while the offense of which they were convicted had been made felonious by a later act. State vs. McKee, 104 S. W. 486.

PRIVILEGES OF COMMON AND PREFERRED STOCK.

IN 1904, a petition was filed by Charles Elmore in the District Court of Dawes County, Nebraska, asking an injunction to restrain Duncan McMillan from disconnecting plaintiff's telephone. The defendants were the Chadron Co-operative Telephone Company and its officers. The plaintiff claimed to be entitled to the use of a telephone at a monthly rental of 75 cents, by virtue of a purchase of one share of stock in the company from one Willis Schenck. The defendants had disconnected his telephone because he refused to pay a monthly rental of $2. The company had been originally organized for the benefit of its members, who paid seventy-five cents per month for their telephones, outsiders being charged $2. The company incorporated and each of the members received a share of stock known as "original stock." Other stock was afterwards issued which was known as common stock. The original stock carried with it a right to telephone service at seventy-five cents per month, while the owners of common stock had to pay $2 per month for their telephones. The plaintiff claimed to have bargained for a share of the original stock, but it was denied by the defendants that original stock was the kind he bought. Schenck had tendered to him a share of common stock, but this he refused, whereupon Schenck tendered him the purchase price he had paid. The corporation was not a party to the action. The Court held that because he had refused to accept the share of common stock tendered to him, he had no right to maintain his suit. The question of the right of the company to make such a distinction as it did between common and preferred stock was not passed upon. Elmore vs. McMillan, 113, N. W. 165.

POLICE CONTROL OVER OPERATION OF FRANCHISE IN WISCONSIN.

THE Wisconsin Metropolis Telephone Company brought mandamus proceedings against the Aldermen, Mayor and Board of Public Works of the city of Milwaukee, alleging that it had presented a petition to the Common Council, which had annexed thereto a plan indicating the streets of the city upon which it wished to run its lines. The petition informed the council of the official character of the company and that it was willing to comply with all reasonable rules and regulations, closing with a prayer that the petition and map might be referred by the council to the Board of Public Works. A month later a petition accompanied by a similar plan was presented to the Board of Public Works praying them to take action upon the proposed plan, to approve or finally amend it, and prescribe proper rules and regulations. The Common Council and Board of Public Works took no action in reference to the petition.

The Supreme Court of Wisconsin held that no mandamus should be issued, thus reversing the action of the Circuit Court. In its decision, the Court held that the telephone company had, by grant of the Legislature, a franchise right to lay or erect its wires in the streets but that the city had the power of reasonable police control and regulation over the exercise of such franchise. This power of regulation included the prescription of those streets upon which the wires should be placed, and also the method of construction so far as public welfare was concerned. It was further held that no duty rested upon the city to approve a plan of streets or to prescribe regulations for such a corporation until due application was made. The common council was held to be the only branch of the city government vested with authority to promulgate the plans and regulations.

As the only request made of the common council in this case was that it should refer the plan to the Board of Public Works, the Court held that no demand had been made upon the common council for a prescription, and hence it violated no duty in ignoring the company's petition. State vs. City of Milwaukee, 113 N. W. 40.

TELEPHONE CONVERSATION AS EVIDENCE.

EVIDENCE as to what a person holding a conversation over the telephone told the witness on the stand was said by the person at the other end of the line is not rendered admissible as evidence by a subsequent statement to the witness by such other person, that he had received the information which was telephoned him at the time such conversation took place. This was established in the case of Texas and Pacific Railway Co. vs. Felker, 199 S. W. 439.

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Explicit Answers to Practical Questions

TO WIND ELECTRO-MAGNETS FOR REQUIRED FORCE.—(943.)

Will you kindly advise the writer at an early date, either by mail or through the columns of your publication, the points to be considered in winding cores of relays to secure a predetermined amount of pull?

W. F. E.

IN coiling wire around an iron core for the purpose of creating a magnet, the first point to be noted is the amount of wire that can be put upon the core. Since the magnetizing effect of the current decreases as the distance from the core increases in proportion to the square of the distance, it follows that we do not gain power if we add on layers of coils beyond a certain point. In practice it will be found that no advantage is gained in putting on more wire than will increase the cross section of the completed electro-magnet to three times that of the bare core.

The second point to be considered is the gauge of wire to use. Experiment has shown that the effect is the same where one thousand amperes are sent once around a core or one ampere is sent one thousand times around the same core. In other words, the magnetizing effect is proportional to the number of ampere turns of the coil. Where one is dealing with a large current with small force, a few coils of large wire should be used, not only for the sake of carrying the large current, but also to avoid resistance, but where the current is small and the force large, it is advisable to use fine wire.

GROUND TEST WITH VOLTMETER.—(944.)

Will you kindly publish as soon as possible the method of making ground tests on telephone lines with voltmeters, giving a complete diagram of circuit and formula? For this information I wish to think you in advance.

W. E. A., Conn.

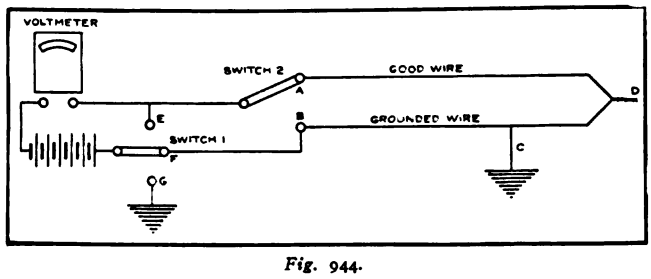

Fig. 944.

IF grounded faults were of practically zero resistance and the ground connections between the fault and the battery also of zero resistance, the location of a fault would be comparatively easy, as it would then only be necessary to measure the resistance of the line wire up to the fault. But ground connections or faults rarely fulfill this condition. In fact they usually vary from time to time and it becomes necessary to use a test in which the resistance of the fault is entirely disregarded. A way in which this can be done is shown very clearly in Figure 944 in which a good wire *A* is connected at its far end with the grounded wire *B*.

In making the test for the location of this fault, switch No. 2 is placed on *A* and switch No. 1 on *F*, thus securing the resistance of the loop *A B*, after which we place switch No. 2 on *B* and switch No. 1 on *G* and secure the resistance *B C*. It is evident that *A C* and *B C* include the resistance of the fault to earth. The resistance *A C* and *B C* being added together and subtracting the resistance of *A B* will leave twice the resistance of *C* to earth. Twice the resistance because it has added in both *A C* and *B C*.

If the resistance of *C* be subtracted from *B C*, it will give a resistance of *B* to *C*, knowing which we can determine the distance in feet by applying the result to the wire table covering the class of wire of which the line is constructed.

To secure resistance on a system of this kind with your voltmeter, first place switch No. 1 on point *E* and take a reading. This reading we will call *Z*. Then take one of the three readings as indicated before which we will call *Z'*. The resistance of the voltmeter we will designate by *R*; then the formula would be $\frac{Z \times R}{Z'} - R = X$ or the resistance desired. This formula is arrived at as follows: The E. M. F. of the battery is first noted by moving switch 1 to the point *E*. It is then moved to point *F* or *G*, as the case may be, and the E. M. F. noted. The first deflection showed the deflection of the voltmeter caused by the battery through the resistance of the voltmeter. The second deflection was through the resistance of the voltmeter and also the resistance of the line. If the resistance of the voltmeter is 10,000 ohms and the first deflection 10, only one degree of deflection would be obtained through ten times 10,000 or 100,000 ohms, which later is the constant for the voltmeter. Supposing the second deflection to be 5, then the resistance of your line is therefore $\frac{100{,}000}{5} = 20{,}000$ ohms, but the resistance of the voltmeter must be deducted, which is 20,000 — 10,000 = 10,000 ohms as the resistance of the line. Of course it will be readily understood that this is simply by way of example and that these same figures are not likely to obtain on tests on your line.

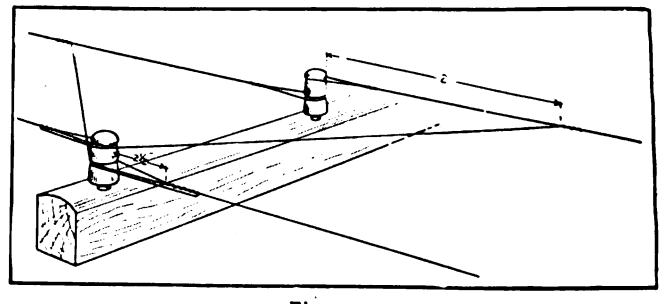

Fig. 945a.

TRANSPOSITIONS.—(945.)

I have a lead of poles which parallel a high tension lead for about five miles. My lead consists of two toll lines mounted on pole pins of separate cross arms. I find some noise on the lead when the high potential current is turned on and expect to cut in transpositions at an early date. We have had some little argument as to the correct method of cutting in these transpositions and would be more than pleased to have you show, if you will, the most improved method of making transpositions. Also advise the method used in England for doing this, as it is on this account that our argument is taking place, my partner being recently from Europe. D. L. D., Iowa.

FIGURE 945*a* shows one of the most improved methods of cutting in transpositions and is so very clear that we are sure no further explanation will be necessary.

In such a lead as you have, the English practice would be somewhat different. Instead of dead ending each wire at stated intervals and making cross connections to the other limb of the circuit, the wire would be transposed from its starting position on one pin and cross arm to another pin and cross arm at the next pole so that the two wires or the circuit would make complete twists around each other through successive definite intervals. In your case the transposition would occur as indicated in Fig. 945*b*. You will note that the 1st, 2nd, 3rd and 4th poles are different, while the 5th pole is precisely the same as the first and the rotation begins again. While this method is satisfactory for neutralizing the effects of electro-static induction and other disturbing influences it makes a much less efficient line.

First Pole	Second Pole	Third Pole	Fourth Pole	Fifth Pole
A B C D	C A D B	D C B A	B D A C	A B C D

Fig. 945b.

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For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—One International Correspondence School Telephone Engineering course. Will sell at half price for cash. Bound volumes included. Address W. R. P., 6670 Hartwell Ave., Chicago, Ill. 972

FOR SALE—500 Stromberg-Carlson central energy wall telephones, golden oak cabinet, 1,000-ohm ringers. All in first-class condition. Address Kansas City Home Telephone Company, 1018 Baltimore avenue, Kansas City, Mo. 977

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Position as wire chief of Independent exchange. Eight years' experience. Address Box 973, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 973

WANTED—Position as manager of Independent company in any part of United States. Ten years' experience. Would take part salary in stock. Address Box 974, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 974

WANTED—Position by a first-class, up-to-date construction man, 25 years' experience, aerial, underground and maintenance; capable of managing a good exchange; can make estimates, handle men; married, temperate, good reference. Address Box 975, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 975

WANTED—A competent telephone switchboard man, one who is a telegraph operator. Write, giving references. Address Box 976, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 976

WANTED—Operators desiring to spend the winter in a mild climate can secure employment by applying to the Peninsular Telephone Co., Tampa, Fla. Reference required with application. 968

WANTED—Position by competent young man as manager or superintendent of telephone exchange. Five years' experience and technical education. Married, temperate, good references. Address Box 969, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 969

WANTED—Position as cableman by man with 3 years' experience. Permanent location preferred. References given. State salary. Address Box 970, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 970

WANTED--Continued

POSITION WANTED as Superintendent or Manager of growing company in the East. Five years' experience in all branches. Best references. Address Box 971, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 971

POSITION WANTED by switchboard and instrument man; 11 years' experience on magneto systems. good reference; temperate, age 24. South or Southwest preferred. Address Box 964, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 964

WANTED—Fifty students for instruction in Practical Telephony by experienced engineer. Student graded according to present knowledge. Special price now fifty cents per lesson. SCHOOL OF TELEPHONY, Box 1135, Oklahoma City, Oklahoma. 965

EXCEPTIONAL business opportunity for practical telephone man with some capital to invest in new construction and manage an Independent telephone system of exchanges, toll lines and 500 'phones connecting six towns in a growing, prosperous wheat and timber country. Address 315 Empire State Building, Spokane, Wash. 967

WANTED—Position with progressive Independent telephone company by competent man having nine years' practical experience. Address G. W. Kent, 330 East Rich street, Columbus, Ohio. 966

WANTED—Six good common battery switchboard installers. Give reference and state fully experience. Also state rate of wages per hour expected. National Telephone Co. of West Virginia, Wheeling, West Va. 962

WANTED—$5,000, 5 to 10 years' time, 6 per cent. interest. Interest payable annually or semi-annually. Security gilt-edge. Address Box 945, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 945

CABLE SPLICER wants position. Several years' experience in Telephone, Telegraph and Power Work. Best of references. South or West U. S. preferred. State wages, etc. Address Box 942, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 942

WANTED—Position. Thirty-three years of age, with 4 years' technical training; 7 years' practical experience, from hole digging to Long Distance Construction, Exchange Installation and Management. Address Box 943, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 943

EXPERIENCED telephone accountant and auditor desires position with more room for advancement. Can systematize your business and give you results. If looking for thoroughly reliable and competent man, I can suit you. Address, Box 963, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 963

Telephone Wire and **Cables**

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables — **Aerial—Underground—Submarine Lead Covered Cables**

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company

PITTSBURGH, PA.

Boston. New York. Philadelphia. Atlanta, Ga. Chicago. St. Louis. San Francisco, Cal. Los Angeles, Cal.

ANDREWS STEEL ROD TELEPHONE

Operator's Revolving Chair

No. 78 M.

Steel Foot Rest—Seat and Back readily adjustable to occupant—Height of Chair easily regulated. Frame work made of Bessemer Steel, ⅜ (three-eighths) inch rods twisted and interwoven. Wood work, oak, birch or mahogany finish, as preferred. Metal work heavily plated, Japanese copper finish.

The Most Comfortable High Chair Made

The Most Attractive and Convenient

INDESTRUCTIBLE
Nothing to get broken

24-inch high **28-inch high**

Warranted for 10 years. Send for complete Catalogue and Prices

The A. H. Andrews Co.

174-186 Wabash Av., Chicago, U.S.A.

No. 75 M. Toll Board Chair

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In the Field of Invention

INDIVIDUAL PROTECTOR UNIT.

F. B. Cook, Chicago, patent 870,530, Nov. 5, 1907.

This patent is a division of application 296,714 made by Mr. Cook on cable terminal and system of protection and comprises an individual protector unit adapted to be mounted singly on the cable terminal to accommodate a pair of wires of the cable which are to be immediately placed in service.

PARTY-LINE SELECTIVE SYSTEM.

S. A. Norstrom, Chicago, patent No. 871,043, Nov. 12, 1907. assigned to C. L. Redfield, Chicago.

The system described in this patent comprises one using a combination of polarized magnets and ratchet wheel with pawls which causes by its actuation connections to be made with a line of the station described by means of electrical impulses sent upon the line.

TELEPHONE SYSTEM.

F. W. Dunbar, Chicago, patent 870,551, Nov. 12, 1907, assigned to K. S. & S. Co.

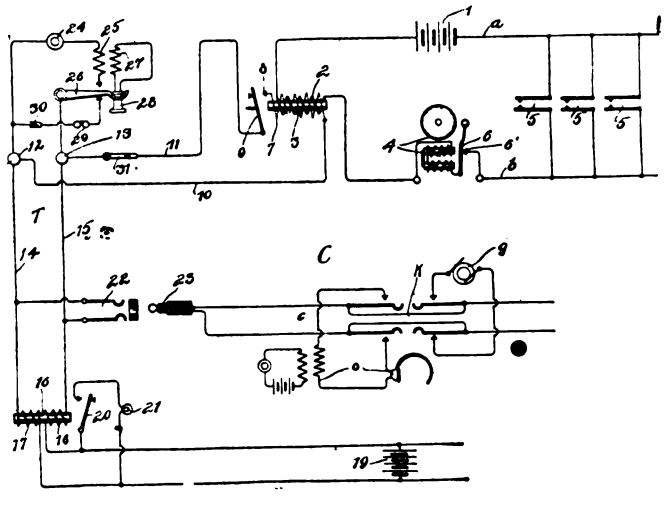
This patent describes a common battery telephone system in which special consideration is given to the provision of a supervisory relay having two windings connected in parallel with the talking circuit. The windings are so placed in opposition that during the passage of the charging currents through both windings, the relay remains inert, it being actuated by unbalancing the windings, as for instance, by sending current through one of the windings alone.

FIRE ALARM SYSTEM.

C. W. McDaniel, Kansas City, Mo., patent 870,574, Nov. 12, 1907.

This invention describes a fire-alarm system employing a number of thermostats 5 which operate a vibrating bell 4.

Included the circuit of the bell 4 the battery 1 and the thermostats 5 is the primary winding 2 of an electro-magnet 3. When current flows through this winding it causes the electro magnet to attract the armature 9, closing the contact at 8, thus bridging the secondary winding 7 across the telephone line 14-15. This ac-

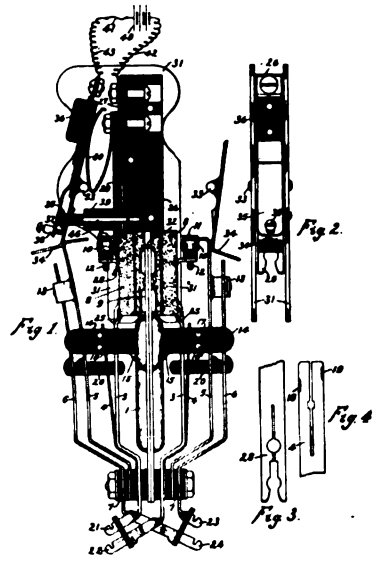


tion actuates the central office signal in the customary manner and the operator, upon inserting her plug in the line jack, receives a humming noise which informs her that the fire alarm signal is operating.

HEAT COIL RESOLDERING DEVICE.

F. B. Cook, Chicago, patent 870,495, Nov. 5, 1907.

The principal object of this invention is to provide a device for automatically resetting and resoldering the protective apparatus in operative condition and position after an operation, so that the protective apparatus may be used repeatedly. When it is desired to set the protector, after having been "blown," to operative position, the resetting device is inserted into the protective apparatus as shown in Fig. 1, 36 being first depressed against the spring 30 to throw springs 34 and 35 to the position shown in Fig. 1 and close the contacts between springs 34 and 35, and springs 27 and 28. As soon as the resetting device is inserted in the apparatus, 36 is released, whereupon spring 30 throws the free end of spring 34 toward the protector, depressing spring 5 until the free end comes in contact with the solder in the pro-



tector 10. Now the circuit of battery 40 is closed through conductor 42, spring 27, the free end of spring 28, the free end of line spring 3, the end 12 of protector 10, the heat coil of protector 10, the solder in 10, the free end of spring 5, a portion of the free end of spring 34, adjustable contact 38, spring 35, conductor 43, and fuse 41. The current from battery 40 now traverses the heat coil 10 and causes it to heat and soften the solder in the protector. When the solder is softened, spring 30 causes spring 34 to depress spring 5 still further until it is depressed to operative position as shown on the right hand side of Fig. 1. Insulating pin 37 breaks the contacts between springs 34 and 35 and springs 27 and 28, and disconnects battery 40 from each of the springs 34 and 28. The solder at end 11 of protector 10 cools and hardens and resolders the free end of spring 5 to the protector 10.

WIRE-SPLICER.

George H. Coughnour, Stuart, Iowa, patent No. 868,178, October 15, 1907.

This patent covers a tool comprising a handle enlarged at one end to form a circular head. Within this is set a cylindrical barrel adapted to rotate in one direction, subject to control of a ratchet movement. Slots are provided both in the head attached to the handle and in the barrel so that a pair of wires may be slipped into the latter. The first wire of the pair extends longitudinally through the center of the barrel, while the second is brought out transversely and engaged by a slot; the oscillation of the handle causes the rotation of the barrel in such a way as to twist one wire about the other.

CABLE HANGER.

M. C. Williams, Kansas City, patent 870,002, November 5, 1907.

This invention relates to a device for suspending cables which may be attached to and removed from span-wires without the use of tools. It consists of a single piece of resilient wire provided at one end with a loop whereby the device may be attached to the span-wire, at the other end with a loop having an upwardly extending end portion. On the loop is attached the marlin twine or other suspension material in which is hung the cable.

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Banks and Trust Companies ADOPT THE EASOPHONE

The irresistible demand forced action. These men would have it.

The officers of several banks and other financial and mercantile institutions whose office equipment must include the most efficient, convenient and attractive telephone apparatus, after a careful examination of the desk type Easophone, instructed the operating company to provide same.

Short-sighted managers refused Irresistible demand.

The subscriber bought and installed the Easophone.

All want them now.

Even the aforesaid managers.

The Company buys the Easophone and

The Company reaps the harvest from new subscribers and new extension contracts.

Write for our offer.

THE WIRE & TELEPHONE COMPANY OF AMERICA, ROME, N. Y.

Manufacturers of telephones, telephone supplies, bare copper, magnet, office, annunciator, weather proof and rubber covered wires.

See our exhibit at the Electric Show, Chicago, Jan. 13-25, 1908.

THE CALCULAGRAPH

Increases Toll Revenue

To a remarkable extent, because by its use there are fewer delays, a larger use of the lines and every fraction of a minute the lines are in use is accounted for.

IT MAKES NO CLERICAL ERRORS

Get Our Reason Why Booklets.

CALCULAGRAPH COMPANY

1437 JEWELERS BLDG., NEW YORK CITY

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.

Lightning Effect No. 5

High Potential Surges of Steep Wave Front

A SUDDEN local electrostatic charge on a line as by a lightning stroke or inductively or by a lightning flash suddenly discharging a cloud or any other sudden local change produces a wave of potential and of current which runs along the line just as a water wave over the ocean surface.

¶ Such a potential wave or impulse is very high and of steep wave front at its starting point, but gradually broadens and flattens out and ultimately disappears if the line is of unlimited length.

¶ But such a wave when reaching the end of the line is reflected and thrown back. The different reflected and transmitted waves superpose upon each other, that is, the impulse is broken up into a number of secondary impulses and local standing waves which reach voltages far higher than that of the travelling wave, just as an ocean wave when approaching the beach is broken up into surf, with wave crests far exceeding in height that of the unbroken wave.

¶ These surges of high wave front must reach the ground the same as all other forms of lightning, and in so doing will choose the shortest path, which is usually through your instruments, switchboard or weakest points of your insulation unless your line is equipped with

SKY ROCKET ARRESTERS,

which always offer an easy path of low resistance to ground and

THEY ALWAYS PROTECT.

Cost Small—Savings Large
Write to-day for sample

CHANCE MFG. CO.

CENTRALIA, MO.

See our exhibit at the Electrical Show, Chicago, January 13-25, 1908.

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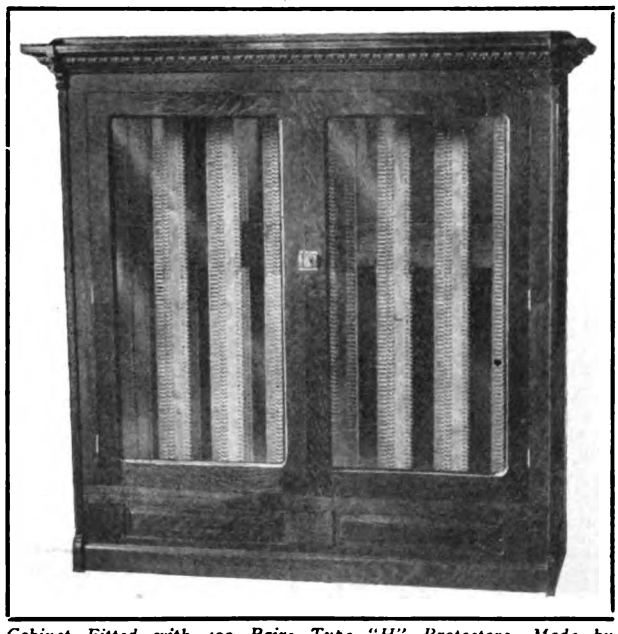
The Manufacturers' Side

THE "AMERICAN" PROTECTOR CABINET.

IN many exchanges of small or moderate size considerations of available floor space, appearance, etc., lead managers to omit the iron frame distributing rack and install in its place a protector cabinet. For those who wish to use this type of equipment the American Electric Fuse Company, of Muskegon, Mich., manufactures a cabinet similar to that shown in the illustration upon this page.

Realizing that the appearance of the cabinet is an important point the company has built it of golden oak, the woodwork on the front and sides being of the best grade of quarter sawed oak, finished in two coats of good varnish, rubbed and polished. Two substantial glass doors in front are each mounted upon three heavy brass hinges, a heavy bronze catch being used for fastening. Enclosed in the rear of the cabinet are two paneled removable doors, each having a bronze spring catch. In the general design of the cabinet care was taken to make ample provision for cable and jumper wires, so that even when the cabinet is fully equipped it is easy to trace a line jumper; and consequently the loss of time and annoyance which is met in an over-crowded frame will not be encountered with this type of equipment. As the cabinet is dust proof it makes it easy to keep the apparatus and terminals in a good clean condition, and this helps the working of the lines. A cabinet of the size shown in the accompanying illustration will take 400 pairs of American "H" protectors complete on cable and switchboard side. The cabinet can, however, be built for any size equipment, and can be furnished with other American protector panels. Strips on the cable side are made of hard rubber with German silver solder tips, to which the cable is attached. Any further information desired can be obtained by addressing an inquiry to the American Electric Fuse Company, either at its factory at Muskegon, Mich., or its branch office, 116 Nassau street, New York.



Cabinet Fitted with 400 Pairs Type "H" Protectors, Made by American Electric Fuse Co.

THE PLACE OF AN INDEPENDENT TELEPHONE FACTORY IN A LEADING MANUFACTURING CITY.

BUSINESS men of Rochester, N. Y., recently decided to publish, in condensed form, a proclamation which would show to outsiders the position in the field of manufacturing and trade which has been attained by various prominent firms located in their city. The leading industries of the city are enumerated and the characteristics of each briefly described. It is interesting to note that in this paper the plant of the Stromberg-Carlson Telephone Manufacturing Company is the basis of an article which is assigned a place of exceptional prominence. The standing of the plant in its home city, which is noted for large enterprises such as the famous plants for manufacturing photographic apparatus, is suggested by the brief sentence, "This establishment is universally conceded to be the largest and finest in the city."

Indications of the great magnitude of the company's business and of the Independent telephone industry to which it contributes, are furnished by the quoted figures of 198,340 subscribers lines which, it is estimated, are terminated at the present time in Stromberg-Carlson switchboards having an aggregate capacity of 503,900 subscribers' lines.

AMERICAN CONDUIT CO., manufacturer of bituminized fiber conduit, with offices at New York, Chicago and Los Angeles, has recently issued a booklet giving some interesting pointers on underground conduit construction. Such matters as the location of manholes, practical hints on digging trenches, material to be used, etc., are covered. This book contains a very useful series of cost cards for the different material entering into a cubic yard of concrete. It will be sent free of charge to interested persons upon receipt of a request. The cost cards may also be obtained separately, printed upon thin paper in a form suitable for pasting into note books, by engineers, managers and foremen of construction.

A PAMPHLET that will be of special interest to telephone companies operating in the smaller cities and towns and parties contemplating the organization or construction of rural telephone lines has just been published by the Century Telephone Construction Company, of Buffalo, N. Y. It is called "The Rural Telephone." It takes up the subject in a very comprehensive manner, beginning by telling when and how to organize a company, taking up the subject of incorporation, by-laws, unincorporated or mutual companies, constitution, order of business, forms for franchises, rights of way, etc., with various forms of contracts. It gives a complete set of specifications for the construction of pole lines and installation of telephones. An estimate of materials needed, remedies for common troubles, switchboard advice, installation of switchboards, and concludes with an illustrated description of Century telephones and construction supplies and tools. The booklet is well worth having and will be sent free on request.

THE VISITOR TO THE PLANT of the INDIANA STEEL AND WIRE CO., Muncie, Ind., will readily see that there is a difference between the common or garden variety of fence wire and telephone wire. The company has two plants running side by side, one turning out fence wire and the other telephone wire. Not only does the care exercised in the production of telephone wire render it a more tedious process, but also more time is consumed in making the telephone wire. From the time the metal is started through the first drawing mill every process in manufacturing telephone wire is more difficult than that for the production of fence wire. Especially in the galvanizing is this noticeable, for not only does the wire run more slowly through the spelter bath, but the galvanizing itself must be of vastly higher quality for telephone wire than for fence wire. The circular matter issued by the Indiana Steel & Wire Company contains material that is of interest to every buyer.

OSHKOSH LOGGING AND TOOL CO., Oshkosh, Wis., handles a wide range of telephone construction tools and specialties. At the present time it makes a special feature of its tree trimmer and linemen's climbers. The company is also selling large quantities of "Kalkeen" insulator pins. Prices and descriptive literature will be sent on request.

AN INSTRUMENT by the use of which it is claimed that two conversations can be held over any single metallic bridging line

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THE TRUTH ABOUT KELLOGG ADVERTISING!

"The Lie"

Extract from Editorial in November TELEPHONY

"It was something like three years ago—in **January, 1905**, to be exact—when TELEPHONY, as soon as the fact of the Bell's ownership of the Kellogg plant had been established, came out with ringing editorials, denouncing the deal, and calling upon all Independents to withhold their patronage from that concern. From that day to this not a line of Kellogg advertising has appeared in TELEPHONY'S pages."

"Soliciting Kellogg"

"January 11, 1905.

"KELLOGG SWITCHBOARD & SUPPLY CO.

"Our records show that the Kellogg advertising contract has expired, and believing that it will be the disposition of your company to continue with us, we are enclosing original and duplicate contract. We will thank you to investigate this matter for us, and if agreeable to have original contract herewith duly signed, retaining the duplicate for your files.

(Signed) TELEPHONY PUBLISHING CO."

"Hypocrisy"

Extract from Editorial in March, 1905, TELEPHONY

"For the past twenty months no Independent telephone man should have purchased one dollar's worth of Bell-Kellogg equipment. . . . We feel more than ever that the Kellogg Switchboard & Supply Co. is a menace to the Independent telephone movement, and we shall do all in our power to show the concern up in its true light. . . . And you, Mr. Independent operator . . . have no right to permit the shadow of the Bell to fall upon you. You must be beyond the possibility of reproach."

TELEPHONY'S November editorial statement is an unmitigated falsehood, and it is because of it and similar statements that AMERICAN TELEPHONE JOURNAL feels that its duty is to correctly inform the telephone operating and manufacturing interests.

The first announcement to the telephone trade of the Kellogg sale was made in the June 13th, 1903, issue of AMERICAN TELEPHONE JOURNAL, and *Telephony* first announced it in its July, 1903, issue—nearly three weeks later.

Telephony carried Kellogg advertising to the extent of 2½ pages in every issue from July, 1903, until and including January, 1905—nineteen months after the sale was publicly announced in its own columns.

Telephony commented editorially on the Kellogg sale in the following issues: July, October, November and December, 1903; January, February, March, April and May, 1904.

It did not say a word against Kellogg in its August and September, 1903, issues; its June, July, August, September, October, November or December, 1904, issues, nor in its issues of January and February, 1905.

Telephony carried 2½ pages of Kellogg advertising in all these issues with the exception of February, 1905; and its December, 1903, and January, 1904, issues carried 4½ pages of Kellogg advertising.

TELEPHONY'S statement, therefore, that from the time of the Kellogg sale it did not carry Kellogg advertising, is a deliberate lie.

We now propose to show that TELEPHONY did not refuse to run the advertising of the Kellogg Company, that it solicited and obtained a renewal of the Kellogg contract in 1904, after the sale, and that it solicited a renewal in 1905, but that it was turned down by the Kellogg Company, nineteen months after the sale was announced in its columns.

Telephony, through its then advertising manager, Elmer E. Smith, obtained a renewal of the advertising contract of the Kellogg Company in January, 1904, for 2½ pages each issue for a year. This was six months after the announcement of the sale.

This contract expired in January, 1905, and on January 11th, 1905, *Telephony* sent the letter printed opposite, asking for a renewal for the year 1905.

Accompanying this letter were contract blanks made out on the basis of 2½ pages, and accepted in advance by an officer of *Telephony Publishing Co.*

AMERICAN TELEPHONE JOURNAL has in its possession photographs of this letter to the Kellogg Company, and also of the contract.

The Kellogg Company, deciding to follow the lead of a number of other manufacturers who had reduced their advertising in *Telephony* to one page per issue, changed the contract blanks to read 1¼ pages per issue, instead of 2½—one page to be used for apparatus and a quarter page for poles.

The original contract blank, now reading 1¼ pages, was signed by the Kellogg Switchboard & Supply Company and sent to *Telephony Publishing Co.* on January 17th, 1905.

Therewith an officer of *Telephony Publishing Company* called on the Kellogg Company, and is said to have stated that *Telephony* would not accept a contract from the Kellogg for less than 2½ pages, asking that Kellogg reconsider the matter and give *Telephony* a renewal on the 2½ page basis. It has been stated that this officer of *Telephony* intimated that "something would happen" were *Telephony* refused the 2½ pages. We are not prepared to vouch for the truth of this statement, but subsequent events seem to throw a great deal of light on it.

The Kellogg Company refused to take more than 1¼ pages an issue, and consequently Kellogg advertising did not appear in the February issue of *Telephony*.

Neither did *Telephony* comment on Kellogg in this February issue.

But "something happened," for in its March issue *Telephony*, still not having received a 2½ page contract from Kellogg, denounced the Kellogg editorially.

This was the first editorial mention of Kellogg, either favorable or unfavorable, that had appeared in *Telephony* in TEN MONTHS.

In view of the above letter soliciting Kellogg advertising, Kellogg's action in the matter, and then an editorial criticism of Kellogg after a silence of ten months, we leave the reader to draw his own conclusion.

Further Evidence of Duplicity

In the light of the above history, the reader, no doubt, can surmise why *Telephony* should "feel more than ever that the Kellogg is a menace," as expressed in its editorial quoted opposite.

But to go on with the story:

This editorial appeared on the first of March, 1905.

On March 8th—one week later—the Kellogg Switchboard & Supply Co. received an order from *Telephony* for part of the equipment necessary for installing an interior telephone system in *Telephony's* office.

This equipment was delivered by Kellogg to *Telephony's* office on March 9th, 1905.

We are in possession of a photograph of the order for this equipment and also a photograph of the receipt for the goods, signed by an officer of TELEPHONY PUBLISHING COMPANY.

Think of *Telephony* on March 1st advising Independents not to buy of the Kellogg and on March 8th giving Kellogg an order for equipment for its own use.

This is the character of the paper that has the effrontery to parade itself as the model of virtue, loyalty and everything that is honorable.

What are we to think after reading this story of duplicity, treachery and falsehood?

Telephony, in closing its November "Swan-song," asks:

"How does Uncle Sam deal with deserters?"

Telephony has good reason to ask such a question. We might answer it in true "Irish" fashion by asking another question:

"How does a decent community deal with the strong arm man, the man caught carrying a lead pipe, the second story man, and the gold-brick man?"

The above story is entirely founded on facts taken from the pages of **Telephony**, and from photographs and other exhibits in our possession.

Duplicates of these photographs may be seen in the office of **Sound Waves**, Monadnock Bldg., Chicago.

Stanley S. Lichty, editor of Western Telephone Journal, Vinton, Ia., has seen the documentary proofs mentioned, and may have copies of the photographs.

Corroborative evidence may be obtained from Elmer E. Smith, now Pacific Coast manager of **Mining and Electrical Engineer**, San Francisco, who was **Telephony's** advertising manager in January, 1904, and also from Ed. J. Mock, now Editor of **Sound Waves**, who was secretary and treasurer of **Telephony Publishing Company** during the years 1903-4-5-6.

We ask the pardon of our readers for presenting this story, and our only excuse is that we were forced to do it. Those that have read the cowardly attacks on other telephone papers will understand our reasons, and to those that haven't read them, we will only say—DON'T.

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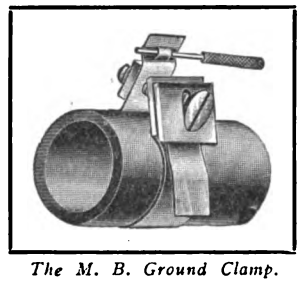
The Manufacturers' Side

without either conversation interfering with the other, is being marketed by the CURRENT ELECTRIC CO., 52 State street, Chicago. It is known as the Standard Duplex Set. The company is also selling the Standard pole changer, which is arranged for alternating and pulsating direct current ringing.

THE MILWAUKEE ELECTRICAL SPECIALTIES CO., Box 393, Milwaukee, Wis., is placing on the market the M. & B. ground clamp for connecting telephone ground wires to lead or iron pipes. This ground clamp has the commendable features that it is simple in construction, very easily adjusted and will readily adapt itself to fit snugly pipes of any size. One feature which the manufacturers claim for this clamp is that it will remain absolutely tight regardless of any contraction or expansion that may take place in the pipe due to change of temperature.



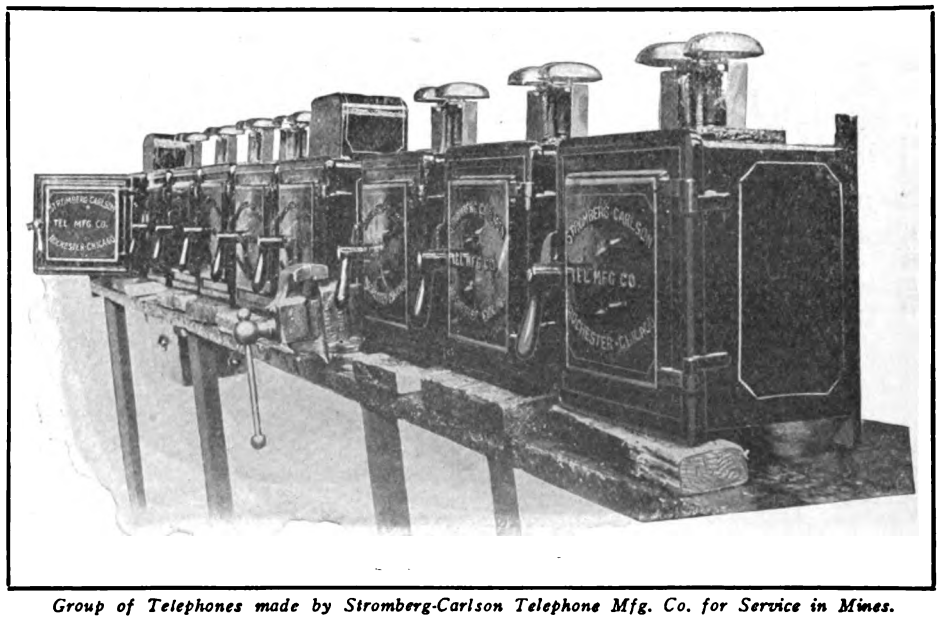
The M. B. Ground Clamp.

As will be noted from the illustration shown on this page, all that is necessary in installing the clamp is to simply loop it around the pipe once, pulling one end of it through the hole provided in one of the brass clamps, drawing it as tight as possible by hand and tightening up securely by means of a screw driver the bolt with which it is provided. A special arrangement is provided on one end of the clamp for the reception of the ground wire.

Further information of interest relative to this specialty may be secured by those interested by addressing the manufacturers.

TELEPHONES FOR USE UNDERGROUND.

THE call for telephones which would meet the peculiar conditions prevailing in mines led to the development of the type of equipment shown in the accompanying illustration, by the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y. The instruments were photographed when set up for the last operation of assembling, and thus a good general idea of their appearance and some of the most interesting features may be obtained.



Group of Telephones made by Stromberg-Carlson Telephone Mfg. Co. for Service in Mines.

A telephone properly adapted for this class of service must be built not merely to withstand the effects of moisture, but all of its parts must be designed with a view to the location of the instrument in an atmosphere charged with gases and corrosive vapors of various kinds. The Stromberg-Carlson Company has installed many sets of apparatus in mines, and its experience has led to the gradual development of the present efficient type. The working apparatus of the telephone is mounted in an inner cast iron case, designed to be absolutely moisture and weather proof. A dome in the upper part of the case, with an opening in each side, contains the bells, and is so arranged that a call may be heard some distance from the telephone, while the mechanism of the ringer is protected from mechanical injury and atmospheric influences. The receiver is placed in a separate compartment at the left of the inner case, but still within the outer case. The outer box, made of iron, has a tight fitting door closing against a rubber gasket, and fastened by a lever movement. Exposed metal parts are treated with a special compound to render them gas and moisture proof, while the coils of wire in the various pieces of apparatus are boiled in a moisture proof shellac varnish compound, and afterward baked. This treatment, it is claimed by the company, is superior to the use of paraffine. Numerous other interesting details, which will be explained by the company upon receipt of inquiries from interested persons, are included in the construction of these telephones.

One of the things which perhaps is not so much appreciated as it should be is that these telephones are an economical type of instrument for use in many locations outside of mines; as an example for police calls and interurban railways.

OWING TO THE ADVANCED PRICE and scarcity of locust pins construction men will no doubt be interested in the Western Union steel cross arm pin recently put on the market by the CENTRAL ELECTRIC COMPANY, 264-270 Fifth avenue, Chicago, This pin is made of highly galvanized steel and has been adopted as the standard by the Western Union and Postal Telepragh Companies. An interesting feature is that the steel pin is said to require only a ½-inch diameter hole as against the 1½-inch hole required by wooden pins. Prices and particulars may be had by writing to the company.

MOON COMBINATION TERMINALS and Junction Splicing Boxes with self soldering nozzles are illustrated and described in a catalogue of the Moon Manufacturing Co., 47-49 Canal street, Chicago. The company claims that it is a matter of great economy to install cable with combination terminals and junction boxes. These are said to form reliable joints which may be readily opened for testing or inspection.

A SPECIAL TELEPHONE LEASE RECORD has recently been put on the market by the SANDWICH POLE CHANGER CO., Sandwich, Ill. It is bound in cloth with leather corners and back and was prepared after a special study of the needs of telephone companies. A 120-page book carrying 1,500 subscribers sells for $3, while a 240-page book carrying 3,000 subscribers is $5. The company also manufactures pole changers, ohmmeters, and duplexers.

THE CONNECTICUT TELEPHONE & ELECTRIC COMPANY, Meriden, Conn., has just opened its new building, which materially increases its capacity for turning out its line of well known and efficient products.

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A NEW DEAL
AND A
SQUARE DEAL
which insures
Dependability and Permanency

"THE PREMIER SPECIAL"
(Compact Type) Get our prices on this Telephone.

Since our acquisition of the Bigley Telephone Co. we can insure our customers a permanent concern on which they can depend for correct goods, prompt and courteous treatment and a COMPLETE SUPPLY OF ALL PARTS which they may need.

We will not only specialize in

RE-BUILT APPARATUS
FOR TELEPHONE EXCHANGES

but will handle all supplies essential for the construction of a complete plant.

All re-built goods will be thoroughly overhauled and tested and will be guaranteed JUST AS GOOD AS NEW before leaving our hands.

WE CAN SAVE YOU MONEY
—often quite important sums, too,—on every purchase.

Try us on

Rubber Covered Wire, Cable Trolleys, Telephone Signs, Telephone Cords,

and all kinds of Telephone and Switchboard Parts. We handle the celebrated "Premier BB" cord. Remember: We are here to stay and will serve you faithfully and well.

WRITE FOR OUR NEW BULLETIN NO. 7.

Premier Electric Co.
58 W. Van Buren St. CHICAGO

REDUCED PRICE
ON

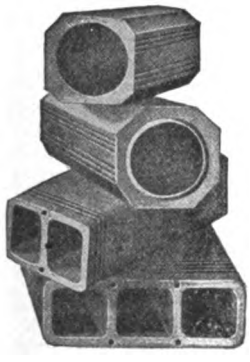
IRONITE

¶ We have made a reduction in the price of IRONITE Duplex Drop Wire.

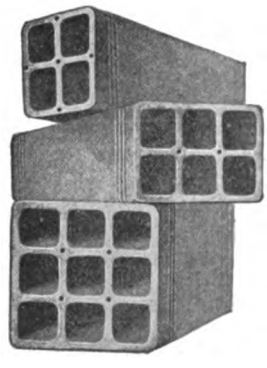
¶ It will always cost less than copper and will always be vastly superior for drop work.

¶ No. 18 B. W. G. IRONITE is a satisfactory substitute for No. 14 B. & S. Copper. The tensile strength is much greater, the insulation superior. It will not sag, stretch or break. It costs 25% less.

Durant Electric Supplies Co.
Sole Producers
52 Fifth Avenue, CHICAGO, ILL.



VITRIFIED
CLAY CONDUIT



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Notes of the Times

NEW COMPANIES.

OSKALOOSA, IA.—An Independent company is being organized at this city and a system is to be installed at once. Among those interested in the new enterprise are George Brown, Daniel Rees, William Hughes, J. D. Thomas, Morgan Williams, J. Williams, R. Brown, Louis Parry, T. L. Rees and William Lewis.

HARLAN, MICH.—The Farmers' Telephone Company has been organized at Harlan and work on the construction of its lines has been commenced. It expects to extend its system to Glengarry, where connections are to be established with the Farmers' Telephone Company of that city.

MOORE, MONT.—A rural telephone company is being formed by the farmers living south of Moore. Already twenty-four subscribers have been secured, and the following officers elected: William McConnell, president; W. A. Caldwell, secretary and treasurer. The new company expects to build about thirty miles of line, and work on the system is to be commenced at once.

BROOKLYN, N. Y.—Articles of incorporation have been filed by the Inter-City Telephone Company, of Brooklyn. The capital stock is placed at $250,000, and the directors are Frederick G. Ashley, 67 James Place; Albert E. Linton, 902 Hancock street, and Thomas B. Stevenson, 26 Myrtle Avenue, Brooklyn, N. Y.

SHAWNEE, OKLA.—Articles of incorporation have been filed by the Shawnee-Tecumseh Telephone Company. It has an authorized capital stock of $100,000 and the following officers and directors have been elected: J. W. Rubey, president; Homer Alexander, secretary; Harry Mend, treasurer; the above named gentlemen, M. C. Fleming and E. E. Hood are the directors.

HAMILTON, PA.—The Wallen Panpack Telephone Company, Hamilton, Wayne county, Pa., has been incorporated with a capital stock of $10,000.

ONTARIO, WIS.—The Ontario Farmers' Mutual Co-Operative Association, Ontario, Vernon County, Wis., has filed articles of incorporation. It has an authorized capital stock of $3,000, and the incorporators are J. C. Williams, A. F. Saunders and others.

CRESTON, B. C., CAN.—The rate payers are organizing a telephone company for the purpose of building a local system.

ACTON, ONT., CAN.—A local telephone company is being organized at this city whose purpose it is to construct lines to Silver Creek, Ballinaford, Ospringe, Crewson's Corners, Knatchbull and Speyside. Address T. T. Moore, Acton, Ont.

BURNT RIVER, ONT., CAN.—The Victoria Telephone Company is being organized at this city and expects to erect and operate a rural line to Fenelon Falls.

SEELEY'S BAY, ONT., CAN.—At a meeting of a number of citizens from Seeley's Bay, Pittsburg, Berrytown, South Lake, Ellisville, Long Point, Sweet's Corners and Morton, it was decided to organize a local telephone company, to install a system in Seeley's Bay and surrounding places. The name of the new company is to be the Leeds Rural Telephone Company, and the following officers and directors have been elected: President, H. H. Elliott; vice-president, R. J. Gardiner; secretary, W. F. Bracken; treasurer, W. H. Hicock; directors, the above named gentlemen and Thomas Anglin, A. Leadbeater, Wm. Leadbeater, Wm. McPherson and Charles O'Connor. The business is to be conducted on a mutual plan, and every subscriber is to be a stockholder.

ST. FELICIEN, QUEBEC, CAN.—The rate payers expect very shortly to vote on a by-law to provide for a municipal telephone system. Address the mayor.

MILESTONE, SASK., CAN.—Throughout the province of Saskatchewan several farmers' telephone companies are being organized. Farmers' Mutual Telephone Company No. 1 has been organized at this city for the purpose of building a rural telephone system in districts surrounding the town. Address J. J. Currie, Milestone, Sask.

VERIGIN, SASK., CAN.—The Doukhobor Telephone Company has been incorporated for the purpose of building telephone systems in the various Doukhobor villages. Address Simon Reabin, Verigin, Sask.

FRANCHISES.

SEYMOUR, IND.—A twenty-year franchise has been granted by the city council to the Citizens' Mutual Telephone Company of Jackson county.

GLASGOW, KY.—At a recent meeting of the City Council a telephone franchise was created. The Home Telephone Company, which a short time ago organized a company at this place, will, it is understood, acquire this franchise and install a telephone system at once.

SPRINGFIELD, MO.—Application has been made by the Willow Springs Long Distance Telephone Company, of Willow Springs, for permission to construct and maintain a telephone line from the east line of the county, near Henderson, Mo., along the public highway known as the Rock Bridge road to Springfield.

ELECTIONS.

PRAIRIE HOME, MO.—The following officers and directors have been elected by the Farmer's Telephone Company: Chris. Ohlendorf, president; F. W. E. Heysel, vice-president; Chris. Smith, secretary and treasurer. Directors: Chris. Smith, Chris. Ohlendorf, F. W. E. Heysel, A. T. Hockenberry, Boone Hurt, N. A. Gilbreath, N. A. George, Theo. Brandes and C. A. Kaiser.

STEUBENVILLE, O.—The following officers and directors have been named by the Knoxville Telephone Company: President, C. B. Smith; vice-president, Geo. Grimm; secretary, James McClelland; directors, John Edmundson, T. G. Warren, Grant Wilkinson, Howard Cooper and John Cooper.

LANSDOWNE, ONT., CAN.—The officers of the Lansdowne Telephone Company are: President, W. J. Webster; vice-president, C. Fredenburg; secretary, R. J. Mitchell; treasurer, G. F. Deane.

FINANCIAL.

FARMLAND, IND.—The Farmland Telephone Company of this city has filed a notice of increase of its capital stock from $4,000 to $12,000.

ST. LOUIS, MO.—The Kinloch Long Distance Telephone Company has declared its regular quarterly dividend of 1¼ per cent.

PITTSBURG, PA.—The directors of the Pittsburg & Butler Telephone Company, a subsidiary of the Pittsburg & Allegheny Telephone Company, has declared a dividend of 16 per cent. from the past year's earnings. Last year's dividend was 6 per cent. The company's earnings for the year equal 22 per cent. of the capital stock.

CHICOUTIMI, QUEBEC, CAN.—The capital of the La Compagnie Cooperative Telephonique du Comte Lac Saint Jean at Chicoutimi has been increased to $100,000 and the company has received additional powers in the surrounding country.

MISCELLANEOUS.

GREEN FOREST, ARK.—Plans have been perfected by which the Green Forest Telephone Company has become the property of the Farmers' Union Telephone Company, the consideration for the plant and franchise being $4,000. It is expected that under the new management the plant will be materially improved and enlarged.

GANNVALLEY, S. D.—The name of the recently organized Independent telephone company at this city is the Buffalo County Telephone Company. It has an authorized capital stock of $25,000, and the officers are: President, J. V. Drips; vice-president, F. I. Hall; secretary, E. E. Dye; treasurer, Arthur G. Hill. It has also elected a board of directors and will at once begin the construction of its lines. The headquarters of the company is to be at Gannvalley, and lines are to be extended from that place to all parts of the county. At least thirty miles are to be erected at once; possibly more, and eventually it expects to connect with the rural lines now extending to Miller and Wessington Springs.

WOONSOCKET, S. D.—The system of the Woonsocket Telephone Company has been acquired by O. Schuler and Guy McCurdy, of Lane, who expect to greatly improve the service rendered to the patrons of that company.

TREZEVANT, TENN.—The name of the newly organized Independent telephone company at this city is the Home Telephone Company.

SHEFFIELD, TEX.—The fifty miles of telephone line formerly owned by the Sheffield Telephone Company has passed into the possession of Messrs. Midkiff and Bennett, the purchase price being $1,750. The new owners expect to build a line from Sheffield to Adams and later on one to Fort Stockton.

BURLINGTON, VT.—Negotiations are under way between the business men of Burlington and M. Buchanan, who operates Independent telephone lines in several counties in the State, for the establishment of a telephone system in this city.

VOLANT, PA.—The Plain Grove Telephone Company, of this place, which also operates an exchange at Plain Grove, is likely to join with other Independent telephone companies in Lawrence, Mercer and Butler counties in the publication of a directory. The new book will include the names of upwards of 1,000 subscribers connected to seven telephone exchanges.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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For Protecting Line Wires

By placing a short piece of **Circular Loom** over weather-proof wire where your lines pass through trees you easily and economically obviate the possibility of your lines becoming grounded and causing trouble.

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IN TELEPHONE SYSTEMS ITS USES ARE LEGION—EVERY ONE OF WHICH MEANS MONEY SAVED

Order from your dealer or address

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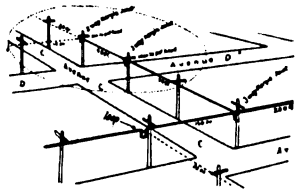
NEW YORK CHICAGO SAN FRANCISCO

FLEXIBLE CABLE DISTRIBUTION



This subject is explained with maps and illustrations in a vest pocket booklet

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W. N. MATTHEWS & BRO.
212 N. 2nd Street ST. LOUIS
See our exhibit at the Electrical Show, Chicago, Jan. 13-25, 1908.

GUY YOUR POLES

WITH THE TIME AND MONEY SAVING

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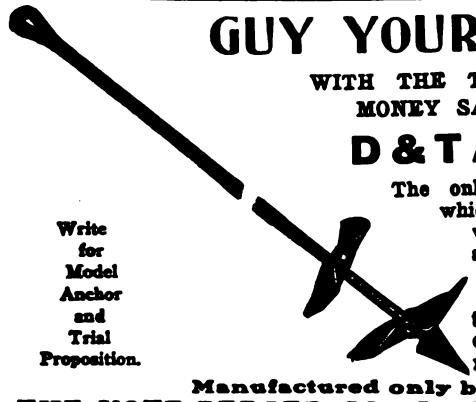

The only patent anchor which is installed without the aid of special tools.

Just drive and twist. Installed by one man in one minute.

Write for Model Anchor and Trial Proposition.

Manufactured only by
THE VOTE-BERGER CO., La Crosse, Wis.
See our exhibit at the Electrical Show, Chicago, January 13-25, 1908.

RESULTS

During the past ninety days we have submitted over five-hundred "LONG DISTANCE" transmitters to as many of the representative exchanges in the country, with the request that they use the sample for thirty days and then return it to us at our expense if they were not so well pleased with them that they wished to keep and pay for the instrument.

We have received remittances from over 90% of all who have had the transmitter in service thirty days, and every mail brings us letters similar to this one—

Ozark, Ala.,
Nov. 12, 1907.

Gentlemen:

We are well pleased with the transmitter. The other operator wants one also, so we send you check to cover another transmitter like the one we have.

OZARK TELEPHONE CO.

May we send you one now on the same conditions?

LONG DISTANCE TELEPHONE MFG. CO.

Makers of "BETTER" Telephones

SOUTH BEND INDIANA

¶ By sending $1.00 now for subscription to American Telephone Journal for the year 1908, you will secure the remaining issues of this year free of charge.

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Notes of the Times

WHEELING, WEST VA.—A deal has recently been consummated by which J. A. Howard, president of the National Telephone Company, has secured possession of the holdings of C. B. Graham and J. C. Heinlein, of the Belmont Telephone Company, thus giving the National Company, through Mr. Howard, control of the Belmont company. The acquisition of this property, which is conservatively valued at $300,000, will give the National Telephone Company connections as far west as Barnesville, and from Parkersburg on the south, to Pittsburg and East Liverpool on the north.

HAVELOCK, ONT., CAN.—A petition has been circulated asking the Havelock Electric Light and Power Company to install a local telephone system.

TORONTO, ONT., CAN.—The Temiskaming and Northern Ontario Railroad, with head offices at Toronto, is negotiating for the system of the Temiskaming Telephone Company at Cobalt.

WINNIPEG, MAN., CAN.—James M. and John J. Kelly, of this city, have received the contract for building the government telephone exchange. It will be completed by Aug. 1, 1908. Cost $97,172.

BRIDGEWATER, N. S., CAN.—The Nova Scotia Telephone Company has purchased the system of the Central Telephone Company, which operated seventy miles of pole line and ninety miles of wire between Bridgewater and Middleton.

PERSONAL.

JAMES BONELL, of Eau Claire, Wis., has been appointed manager of the Wisconsin Telephone Company at Stanley.

C. C. FAILING, manager of the Michigan State Telephone Company at Port Huron, Mich., has received a promotion to the position of district manager in addition to his present duties.

JOHN H. GASTER, who has been in charge of the exchange of the Central District and Printing Telegraph Company at Sewickley, Pa., has been advanced to the management of the McKeesport, Pa., exchange.

GEO. KROTTER, of Bonesteel, S. D., who for the last few years has been manager of the Gregory County Inter-State Telephone Company, has resigned.

A. W. McMACKIN, for some years past manager of the St. Johns exchange of the New Brunswick Telephone Company, has been appointed acting general superintendent of the company.

JOSEPH F. OGDEN, who has for several years been the manager of the plant of the United Telephone & Telegraph Co., at Shamokin, Pa., has been transferred to Uniontown, where he assumes charge of a larger territory.

B. G. SNYDER, formerly located at Oconto, Wis., has recently accepted the position of manager of the plant of the Antigo Telephone Company, at Antigo, Wis.

Pushing Forward

HARMON, ILL.—Among the extensions planned by the Green River Telephone Company is a line to Clatworthy.

AZALIA, IND.—The Azalia Telephone Company, which connects with the Citizens Telephone Company at Columbus, contemplates making many improvements and extensions in its system.

FT. DODGE, IA.—A telephone system is being installed by the Fort Dodge, Des Moines and Southern Interurban Trolley Company.

VIELE, IA.—New lines are being erected by the Viele Independent Telephone Company.

HAVENSVILLE, KAS.—The Independent Telephone Company's improvements include the rebuilding of a number of its lines. It is also constructing a line from Havensville to Avoca, and expects to make its system a thoroughly up-to-date one in every particular.

LAWRENCE, KAS.—The lines of the Home Telephone Company in this city are to be extended.

AUGUSTA, ME.—The Northeastern Telephone Company, which has obtained a franchise in Augusta and expects to eventually establish a system there contemplates the expenditure of several thousand dollars in improving its service in Phillips, Farmington, Rangeley and other places.

OAKHAM, MASS.—A new line throughout the southern part of Oakham is being erected by the Parker & Conant Telephone Company.

BEAR LAKE, MICH.—A line from Bear Lake to Goodrich is among the extensions planned by the Benzie County Telephone Company.

ISHPEMING, MICH.—The Marquette County Telephone Company, which is installing a new switchboard at this city, expects to make many other improvements in its plant.

KALAMAZOO, MICH.—Plans are being drawn up by the newly organized Kalamazoo Home Telephone Company for the installation of a system having an ultimate capacity of 7,000 telephones, with 3,000 lines equipped.

WINONA, MINN.—The Winona Telephone Company, which has just completed the stringing of a little over six hundred feet of cable, intends ultimately to replace all of its wires in the city with cables. The company has also built a number of rural lines, and expects to still further enlarge this portion of its system.

JOPLIN, MO.—The Home Telephone Company is planning for connections with Pierce City, Monett and Aurora, which will greatly improve the toll service for its local subscribers.

LA BELLE, MO.—Considerable cable is to be hung by the La Belle Telephone Company in making the improvements which it has planned.

BUTTE, MONT.—Among the extensions planned by the Independent Telephone Company is the installation of an exchange at Cementville, in the Missouri valley, a short distance below Three Forks.

NEIHART, MONT.—Among the new lines to be erected by the Forest Service is one from Neihart to Woolsey, a distance of about twenty-two and a half miles. Another line is to be constructed from Neihart to the Judith River ranger station, a distance of about thirty-three miles. It is estimated that considerably over $5,000 will be spent in making these extensions.

STEVENSVILLE, MONT.—Many improvements and extensions in its plant are being considered by the Burnt Fork Telephone Company, which now operates thirty-six miles of line.

SANTA FE, N. M.—A telephone line from Santa Fe to a spot thirty miles east of Santa Fe on the Pecos River is to be constructed by the Bureau of Forestry.

BAINBRIDGE, N. Y.—The Bainbridge Telephone Company, which has just completed a line to River Landing, giving service to all stations on the Atlantic Coast Line Railroad between Bainbridge and the Junction, is planning for the construction of a line to Sneads.

COLUMBIANA, O.—At a recent meeting of the Unity Township Telephone Company, held at Columbiana, it was decided to extend its service into the southeastern portions of Mahoning county, which will necessitate the building of a number of new lines.

FINDLAY, O.—The lines of the People's Telephone Company are being thoroughly overhauled, and its plant put in first-class condition.

FORT ANCIENT, O.—The Valley Telephone Company, which has been developing its plant very rapidly, now contemplates the construction of lines from Fort Ancient throughout the Silver Grove neighborhood to Gum Grove, Olive Branch and numerous other points. Their plans for the future also include the construction of a line to Clarksville.

MIDDLETOWN, O.—Work on the installation of its system has been commenced by the Home Telephone Company.

HILTONS, VA.—Additional lines are being constructed by the Gate City Telephone Company in this city and its system is being otherwise improved.

RANDOLPH, VT.—Work on the construction of a trunk line between Randolph and Northfield has been commenced by the Orange County Telephone Company, which expects eventually to install an entire metallic system.

TOPPENISH, WASH.—The Yakima Valley Telephone Company, which has been granted a franchise at this city, contemplates the establishment of an exchange at an early date.

ATTICA, WIS.—The lines of the Attica Mutual Telephone Company are being extended east of Albany.

BRANTFORD, ONT., CAN.—The Canadian Machine Company has completed its construction work outside of the city of Brantford. It has secured a franchise in that city, and its central plant is now in the course of erection. It is the company's intention to enter the city and operate in competition to the Bell company.

BRIGHT, ONT., CAN.—The Innerkin Rural Telephone Association, which has already installed a number of telephones, expects to greatly enlarge its plant.

LANSDOWNE, ONT., CAN.—The Lansdowne Telephone Company, which operates in the counties of Leeds and Grenville, is considering the advisability of extending its lines in many directions.

LEBRET, SASK., CAN.—The government telegraph department expects soon to commence the construction of a telephone line from Lebret to Balcarres, thence to File Hills Indian agency, to connect with Inspector Graham's office.

MOOSEJAW, SASK., CAN.—Five hundred telephones have already been installed by the Moosejaw Telephone Company and other improvements are contemplated.

ROULEAU, SASK., CAN.—A local telephone system has been installed at this city by the Saskatchewan Telephone Company, of Moosejaw, and other extensions are being planned for.

UNDERGROUND.

EVANSVILLE, IND.—Arrangements are being completed by the Cumberland Telephone Company for the installation of its wires in the business district in underground conduits.

MOUNDSVILLE, W. VA.—Application has been made by the National Telephone Company for permission to place its wires underground along the county road through the Narrows above Glendale.

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Single copies, 10 cents. Subscription price, $1.00 a year. Foreign countries $3.00 a year.

The American Telephone Journal

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VOLUME XVI. SATURDAY, NOVEMBER 30, 1907. NUMBER 22.

Rules for Operating Room Employees

A Complete Set of Instructions and Rules for the Government of Local Operating Room Employees.

COMPILED BY KENDALL WEISIGER.

Illustrations from special photographs by John Putnam.

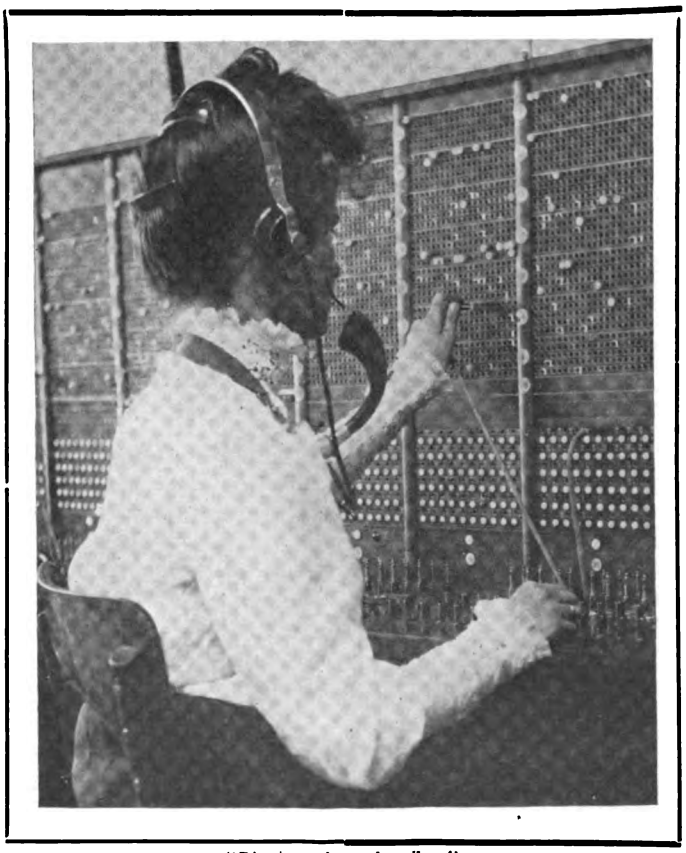
MUCH depends upon the manner in which the more strictly personal features of discipline are enforced in an operating room. Continuing the broad division of the subject begun in last week's section of this paper, the following instructions have been found useful:

Attention to Duty.—Operators will sit facing the switchboard while on duty, devoting their entire attention to their work; they must not look around the room except for the purpose of ascertaining the time of day.

Advancement. — Employees are advanced solely in accordance with their merits as shown by their individual records. It, therefore, depends entirely on the proficiency of each employee as to how rapidly she will be advanced.

Conversations Between Operators.—Operators will not indulge in conversation with one another while at the switchboard; they must never talk nor dispute over the call circuits for any reason whatever.

Conversation With Subscribers.—Operators must be courteous in all their dealings with subscribers, but must never converse with them. Upon a request for any information, other than for the time of day, a subscriber must be connected with the Information Desk. In case a subscriber wishes to make a complaint concerning the telephone service, or to report a trouble, he should be connected with the Complaint Desk. Request for connection with the Manager or Chief Operator should be complied with immediately and without question.



"Ringing the subscriber."

¶ It has become a well established practice for telephone operators to give the time of day as a slight accommodation to the company's patrons. To this end many companies have provided standard clocks, located conveniently in the operating room. In larger offices the clock dials are illuminated at night by means of an electric bracket, so arranged with a reflector as to throw the light on the face of the clock.

Secrecy of Telephone Conversations.—Employees must not listen to conversations unnecessarily, and are forbidden to divulge the contents or nature of any communication between users of the telephone. Employees are hereby informed that there is a legal penalty which may be imposed for divulging information obtained by listening to telephone conversations.

Going On and Off Duty.—In going on duty, operators will register (where time recorders are used), form in line, and at a given signal file in to the position assigned to them. Operators are prohibited from talking while entering and leaving the operating room. In leaving the operating room they must go out in regular order, and in no case should one operator pass or go in front of another. Operators must not remove their telephone sets until the retiring room has been reached. After leaving the operating room an operator should not re-enter the room unless she wishes to speak to the chief supervisor on business, in which case she must lay aside her hat and coat before entering the room.

¶ In the larger offices there are two justifiable methods of keeping operators' time: one is by means of a time recorder and the other is to have a supervisor detailed to the retiring room for the purpose of recording the arrival and departure of the force and to see that the number of operators required for each shift is on hand and ready for work at the required time. This supervisor is known as the "Quarters Supervisor," and in addition to fulfilling the above duty she is responsible for the condition of the quarters and for maintaining discipline therein.

EDITOR'S NOTE.—This is an actual set of working instructions for a traffic department. Supplementary notes inserted for the information of telephone men who are not operating experts, or to explain doubtful points, but not properly included in the actual working copy, are contained in paragraphs preceded by the sign (¶). Continued from the issues of November 16 and 23.

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¶ The entrance of any female attired in street dress generally has a tendency to cause the operators to look around, hence the provision regarding the laying aside of coats to prevent any possible distraction from the operators' work.

Manner of Relieving Operators.—Operators must not leave their positions at the switchboard at any time without the permission of the supervisor. When a change is to be made, the relieving operator, with her telephone set adjusted in position, will take her place at the left of the operator to be relieved, and insert her plug in the extra jack intended for the purpose. Upon a given signal, the operator at the switchboard will quickly remove her plug from the jack and step away from the switchboard to the right. The relieving operator will immediately step into the vacant position. When the operator has taken her position, she should, at the earliest possible moment, change her plug to the jack nearest her, so that the next relieving operator will have access to the outer jack. In every case, the operator relieved must inform the relief operator as to the exact status of all incompleted connections in the position, so that the continuity of the service will not be broken.

Fire Drill.—A switchboard fire drill will be held from time to time; instructions governing the actions of the operating force during a fire drill will be posted on the bulletin board in the retiring room.

Notice of Resignation.—Employees, in order to leave in good standing, are required to give at least thirty days' written notice before resigning, and when leaving, will turn over to the Chief Supervisor all property belonging to the company.

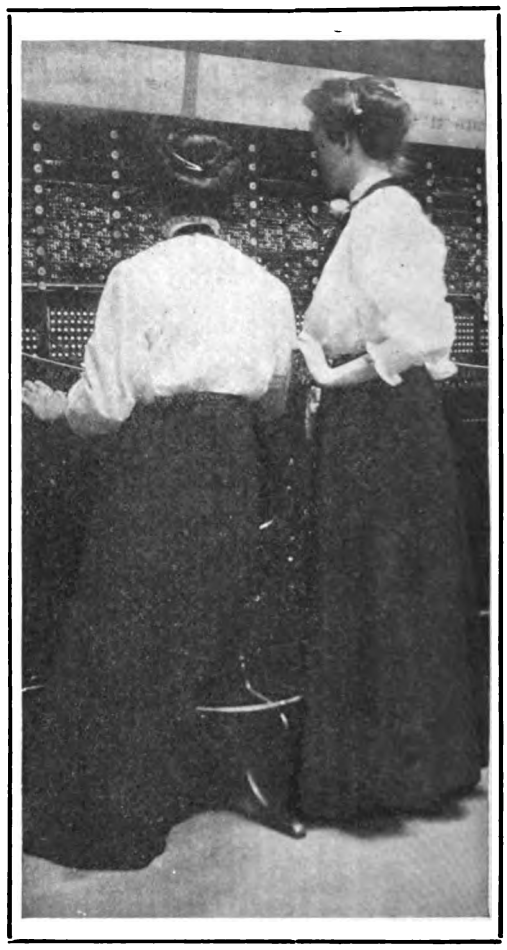
OPERATING METHODS, "A" BOARD.

Answering Line Signals.—(a) Answer with the back plug nearest the jack of the calling subscriber, reserving the two pairs of cords on each end for answering calls in adjacent positions.

"The relieving operator will take her place at the left . . . the operator at the switchboard will slip away to the right."

¶ It is the practice with some companies to require their operators, when not engaged, to hold a plug ready to instantly answer a line signal. This practice is to be avoided, as it tends to produce wide variation in the speed of answer due to the fact that an answer is given during the slack hours of the day with speed that cannot be maintained during the busy hours. A uniform speed of answer even as slow as four seconds is more satisfactory to the subscriber than a speed of answer varying between one and eight seconds. By selecting the cord nearest the jack of the calling subscriber the operator, to a great extent, prevents the tangling of her cords. This increases the speed of disconnection and assists in tracing out cords when it is desired to find the jacks with which they are connected.

(b) Throw the listening key before the plug is picked up, or at the same time that it is being inserted into the jack, so as to be able to answer immediately.



The relief operator taking up the position.

(c) Answer the call by saying *"Number?"* in a pleasant tone of voice, with the rising inflection.

¶ The expression "Number, please," is used by several companies both in this country and abroad. The practice is, however, about equally divided and apparently depends to a large extent upon the individual choice of the traffic manager. It is felt by a good many that the one word "number," if spoken with the rising inflection and in a pleasant tone of voice, will imply the same politeness as though the word "please" were added to it.

(d) Upon receiving the number from the subscriber, repeat it to him for check in a clear distinct tone, allowing the voice to fall at the end of the repetition. Give the subscriber time to correct errors before closing the listening key.

(To be continued.)

NEW COMPANY ASKS FOR FRANCHISE AT MARION, OHIO.

AT the last meeting of the city council of Marion, Ohio, on November 19th, an ordinance granting a franchise to a proposed new Independent telephone company was introduced and referred to the franchise committee.

Those heading the movement for this new company are H. D. Critchfield of Milwaukee, Wis.; I. C. Aye, H. N. Quigley and Congressman G. E. Mouser of Marion.

The introduction of this ordinance is looked upon by persons in that locality as being the first step in a local telephone war which has been anticipated ever since the recent consummation of the consolidation deal between the Marion County Telephone Company and the Central Union Company, as a result of which connections with thousands of Independent subscribers in other Ohio towns have been lost to the people of Marion.

It is interesting to note that when these two companies connected for traffic purposes all free country service was discontinued, but now on the first indication of the possible presence of Independent competition the Marion County Company announces free service from Marion over the entire county, to be again effective December first.

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Forceful Advertising*

By H. H. Mack.

ADVERTISING is quite generally associated exclusively with newspaper publicity—with display space in newspapers. Telephone men should all get away from this narrow view of so great an institution. Advertising means, simply, publicity—the purest of all publicity. Your advertisement tells the public what you have by informing them of the facts concerning it. You are careful, however, to call their attention to facts favorable to your undertaking—facts that will cause the public to desire the thing you have to sell. This, then, is advertising, let it come from wherever it will—newspapers, street cars, circulars or personal work—the last the best of all. Personal work of individuals with their friends is the best advertising in the world.

There are phases of this topic which have a very direct bearing upon the work of every employee of the companies mentioned. The work of promoting, organizing and constructing a great telephone system is a prodigious undertaking, an undertaking which calls for the most attentive teamwork on the part of every one connected with the enterprise. Employees of public-service corporations often make a mistake in assuming that the success of the undertaking depends exclusively upon the character of the work done by those who come directly in touch with the public. In a telephone company the contract division of the work is an important one, for subscribers the company must have, as without them one of the most important features of the work, the declaring of dividends, will be lacking. Still, the employees of the contract department are not the only ones that come into contact with the public. Every employee of the company has a more or less extended circle of acquaintances, all of whom have confidence in his judgment. He should regard it as his duty to line up for the company every man within the sphere of his influence.

A small band of well-drilled, enthusiastic men has often accomplished more than a great army of paid soldiery, whose hearts were not in the work in hand. We had an example of what teamwork and burning enthusiasm will do when pitted against ignorant stupidity and blind brute force in connection with the recent war between Japan and Russia. Opposition melts away like dew of the morning when brought face to face with determined effort, combined with earnest sincerity and honesty of purpose, and backed by dogged persistance.

"But what part have we in the general advertising scheme?" employees may ask. To each man one may say simply this: "You can quietly recommend the Home telephone service to everyone you know." The service, which this company will give its subscribers will be, without question, the most perfect telephone communication ever furnished in this country. Call the attention of your friends to this fact. The Home telephone will have no better advertising than this.

Someone may say: "I guess my recommendation would not be worth much." This man must not make the mistake of underestimating his own ability to accomplish. One enthusiastic advocate can do more to advance the welfare of any project than forty can do to hinder, provided their opposition is of that perfunctory sort that can be bought with money. Use your own personal pull for every inch it is worth and you will be surprised at what you will be able to accomplish in an advertising way. The Home Telephone Company has had a hard fight to gain a foothold in Detroit, and the fighting is not over yet by any means. Public sentiment is to-day quite favorable to the Home company. It has many tried and true friends. The quiet straight-ahead policy followed by the promoters of this enterprise has won the hearts of very many Detroit people, but it would have claimed hundreds more had they known the circumstances. The employees of this company can help to make sentiment favorable to the Home company simply by giving out information concerning a few facts.

The following are some of these facts:

That it is not safe to grant to any corporation a monopoly of public service.

That the advent of the Home Telephone Company in the Detroit field will result in a great improvement in the general quality of local service.

That the establishment of the Home Telephone Company in Detroit will eventually result in lower service rates than would have been maintained had the Bell company been left in undisputed occupancy of the field.

That the Home has spent nearly $4,000,000 on its Detroit plant.

That the Home has constructed the best and the most substantial subway system in the world.

That the apparatus with which the exchanges are equipped is of the most expensive and up-to-date type.

That the heads of departments in the Home organization are all experienced telephone men, who will be able to give a better service than Detroit has ever known.

That the directorate of the Home company includes several of Detroit's leading business men and bankers.

That the firm's business has all been cleared through Detroit banks.

That material for construction has been purchased as far as possible from Detroit manufacturers.

That Detroit laboring men have been employed to do construction work.

That more than $85,000 has been spent for real estate and $200,000 for buildings.

That the building sites were purchased through local real estate dealers and the buildings planned by Detroit architects.

That the building material was furnished by Detroit dealers and the work done by Detroit mechanics.

That the Central Exchange will include nearly the entire business district, making it impossible that the Home service shall ever become like that Detroit has been afflicted with during the past summer.

That the appearance of a firm's name and business card in the Home directory once in regular, alphabetical order and again under a classified head in the back part of the book, will be worth the entire cost of the service as an advertisement.

That the omission of the name of any business firm from the Home directory will result in more damage to that firm than ten times the cost of the service.

That the Home will not sell out. Not money enough in Detroit to make the purchase. We are here to do business.

Call attention to the advantages of being put in touch with 150,000 users of Independent telephones in Michigan and 500,000 more scattered throughout other states.

The promoters of the Home Telephone Company have demonstrated their faith in a greater Detroit by providing facilities for 100,000 telephones.

Two telephones are better than one when the one is the wrong one.

There are some people working for the company who will have to do directly with the public in connection with the mechanical and operating departments, service departments, installing instruments, wiring buildings, collecting telephone bills, etc. Now this service is the most important connected with the telephone business, aside from the contract department. The men who do this work can make or break a company. The courtesy shown by a man that is visiting houses and coming in contact with people will have more to do with sentiment either for or against the company he represents than anything that can be done. It appears that a man's duty along this line is to

*Abstract from an address to employees of the Home and Long Distance Telephone Companies, Detroit, Mich., October 25, 1907.

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respect most thoroughly the rights of private ownership and private property. Some people have a wonderfully exaggerated idea of the sacredness of private property. The people that are the most particular and finicky are the property owners; the men who own their own homes want their lawns kept nice, and the women don't want the wall paper torn off the wall in installing instruments. Telephone men must respect these rights, for these are the subscribers who have the property, and who can pay their telephone bills.

WHY SHOULD A SUBSCRIBER PAY FOR MOVING A TELEPHONE?

THE following query was published in AMERICAN TELEPHONE JOURNAL, issue of August 19: "We should like to have some reasons to place before our subscribers as to why they should bear the expense of moving a telephone from one address to another, and also on inside removals. This is a source of much argument on the part of subscribers, as they don't feel that they should bear this expense. An answer to the above through your columns will be greatly appreciated." The editor invited readers with good arguments to send them in. One argument received from Messrs. J. B. Thiess and G. A. Joy, of Chicago, Ill., is in substance as follows:

"We would like to submit the following as reasons why the subscriber should bear the expense of telephone removals:

"To begin with, we would like to resurrect the old statement that the telephone company is in business to give telephone service, and that the installation of the subscriber's set is one of the necessary evils essential to the giving of this service, and consequently when the set is once placed in a certain location at the subscriber's request, the telephone company has done its duty, since the company is then in a position to give what has been contracted for, namely, telephone service.

"In all well-regulated telephone companies it is customary for the telephone company to require the subscriber to sign a contract for at least one year's service, and therefore when the telephone company has placed its apparatus on the premises of the subscriber, and continues to give good service, it has complied with its part of the contract, and it remains for the subscriber to pay for such service at the rate stipulated.

"Now, in case the subscriber desires to have his set moved, he is asking for a service from the telephone company that was not bargained for in the contract and consequently it is plausible that he, the subscriber, should be called upon to pay for this additional service. This will be clear when we consider that the telephone company in their contract have guaranteed to give telephone service, and as they are in a position to do so, they are living up to their contract. Furthermore, the moving of the subscriber's set will be an additional expense to the telephone company, and it is but natural and reasonable, since this is an additional expense not covered in the contract, that the burden of moving the same should fall upon the party to be especially benefited therewith, namely, the subscriber.

"To carry the discussion a little further we will consider that after the telephone has been in place a year or more, the subscriber calls upon the telephone company to move his set. In this case the provisions of the original yearly contract have been fulfilled and the subscriber is in a position to demand a removal of the set, in which case, however, he will be required to sign another contract similar to the original one binding him again for one year.

"In order to emphasize the above arguments we will quote some of the terms of the Chicago Telephone Company. These are as follows:

"*Change of Address or Location.*—The company will move the equipment to any point where the company furnishes similar service, within the limits of the same exchange system, accessible with its facilities, upon written order, when the subscriber agrees to pay the company's current charges therefor, viz.: Change of address, $5; change of location within same premises, $2.50; change of instruments, $1.50.

"'Such removal will be made without charge after the equipment has remained in the location for one year, but such removal without charge will constitute an express extension of the subscriber's contract for a period of one year from the completion of the removal. After a removal, the subscriber shall pay the current rate for service at the location to which the removal is made.'"

Simultaneous Telephony and Telegraphy Over One Grounded Wire*

By N. C. KISSELL.

IN the diagram reproduced in Fig. 2 are shown a terminating station, an intermediate telegraph station, an intermediate telegraph and telephone station, an intermediate telephone station, and another terminating telegraph and telephone station. A portable train set is also shown. One side of this set is hooked to the line wire by means of a line pole, the other side connected to ground by means of a clamp which fastens on the rail. All the telegraph instruments are connected in series, and the telephones are in multiple. When one telephone station rings all the other stations will be signalled, and attention is attracted to any particular telephone by means of a code of rings. The circuits of all the telephones are similar. The method of signalling can be made clear by a consideration of the action of the circuit when *A* is calling on the line, leaving out all circuits not directly connected with the action of signalling, as the complete circuit can always be seen by reference to Fig. 2. Fig. 3 shows the circuit when *A* is signalling on the line, with all unnecessary wiring left out.

Upon pressing the button at *A* current passes from battery through the contacts of the push button to contacts on the armature of the induction coil, thence to the primary of the induction coil and through it back to battery. It will be seen that the instant the circuit is established the induction coil armature will draw up, thereby breaking the circuit, causing the armature to be released and make contact again, when it continues to be drawn up again and released in rotation, the armature vibrating by opening and closing the primary circuit very much like an ordinary electric bell. This rapid make and break causes the number of magnetic lines through the core to rise and fall, inducing an alternating current in the secondary winding of about the same frequency as the rate of vibration of the armature. The E.M.F. of this high frequency current is considerably greater than the inducing current in the primary, as the primary is wound with a much smaller number of turns than are in the secondary. At a given instant then, this current moves from point 1 to point 2, where, encountering the high impedance of coil 3, it passes over line wire X' in preference to the local circuit. Upon reaching point 4 it encounters a peculiar combination of circuits, all of which are in parallel, providing the "Morse" keys are closed. One circuit contains capacity (the condenser); a second containins non-inductive resistance (the 1,000 ohm shunt), and a third contains inductance (the 150 ohm Morse relay). The current will therefore divide according to the different impedances of these branch circuits. As the current is of very high frequency, it will practically all pass through the

*Concluded from the issue of November 23.

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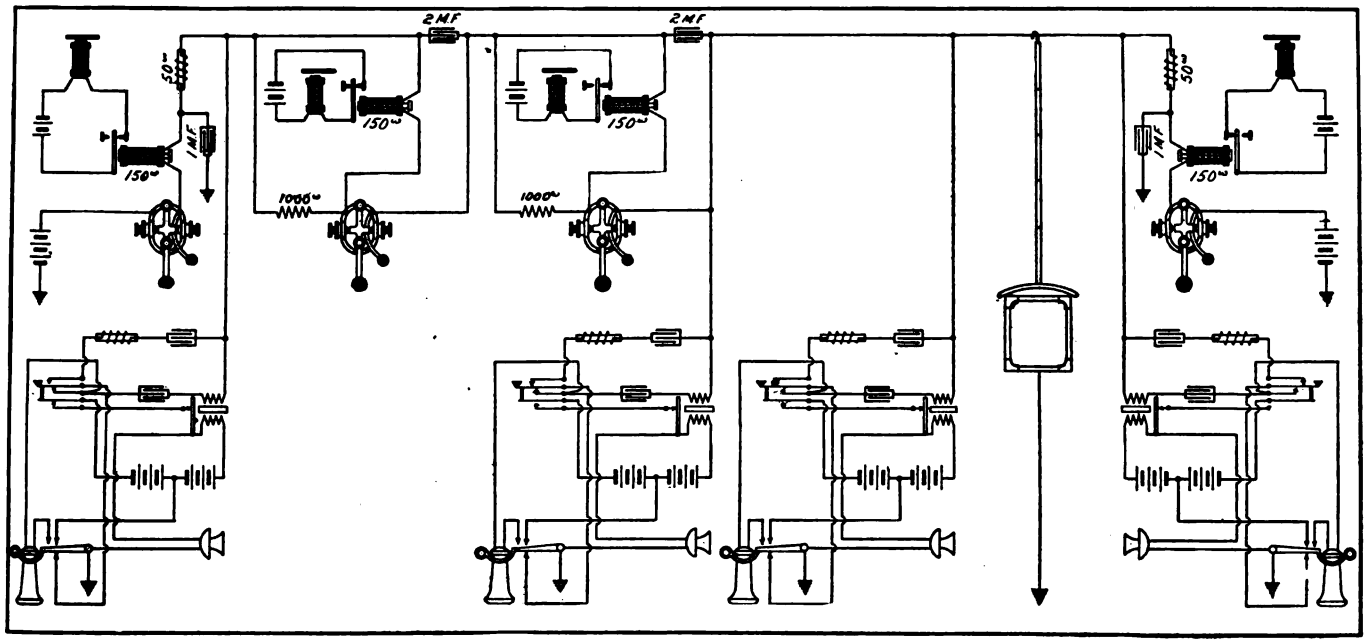

Fig. 2. Typical railway grounded line circuit carrying several telephone and telegraph instruments.

condenser and the 1,000 ohm shunt, very little, if any, going through the relay. On account of its high impedance to rapidly alternating currents the telegraph relay acts much the same as the impedance coils placed at the ends of the line.

If any of the signalling current should pass through the relay it would be so small in quantity and alternate so rapidly that it would not move the armature on account of the inertia of the controlling spring. Of course, if the key at *B* should be open all of the signalling current will pass through the condenser. Current passing out of *B* goes over line wire *X″* to station *C*. Here the current passes through as at *B*, but upon reaching point 5 it has a path offered through the condenser and "howler" in *C's* telephone to ground, thence back to *A* through the grounded spring and contacts of the push button to the condenser and thence back to the secondary winding of *A's* induction coil, and completing the circuit to point 1. The "howler" for the reception of signals is nothing more nor less than an ordinary telephone receiver with a mouthpiece attached. When a current of very high frequency passes through the electromagnet winding it causes the diaphragm to vibrate very rapidly, giving forth a tone or "scream" which is very shrill and can be heard for a good distance. The condenser serves the purpose of preventing the "Morse" battery from going to ground.

At point 5 the high frequency signalling current will divide, and a portion of it will also pass over line wire *X‴* to 6, thence through the howler of *D's* telephone to ground and back to *A*, still a third portion going over line wire *X⁗*, through *E* and back to *A*, being choked back from passing through the telegraph instruments at *E* by the coil 7. To summarize the action, signalling current from *A* passes over the line wire, through each of the telephone instruments which are connected to the line, to ground and through ground back again to *A*, completing the circuit. During conversation the high frequency talking currents pass over this circuit very much as described for the signalling, and the circuit can be considered as a simple telephone line with a ground return.

As stated at the beginning, this circuit is not absolutely quiet, as is a metallic line, but it is commercially satisfactory, and used every day on several of the largest railroad systems. As this circuit has only one line wire, it is of course impossible to transpose it, and in perfectly dry weather it is subject to inductive influences from neighboring telegraph circuits on the same route, but not enough to interfere with its practical working. It is partly this susceptibility to inductive disturbances which cannot be overcome by transposing that hinders this circuit from being operated over great distances.

OFFICIAL BULLETIN NO. 6 OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION.

New Location.—The association is now "at home" to the Independent telephone people at its Chicago headquarters, 629-30 Monadnock Block. You may be sure of a hearty welcome if you will drop in on your next visit to the Windy City.

Convention.—Plan now to attend the 1908 annual meeting January 21st, 22nd and 23rd at the Coliseum, Chicago. No previous engagement should prevent your presence on this important occasion. We want to make this the most successful convention to date—but to do so we must have the active co-operation of every Independent man in the field. Don't be satisfied with merely attending yourself; do a little missionary work in arousing your associates to the necessity of taking an active part. Remember, that it is *your* convention, that its deliberations may

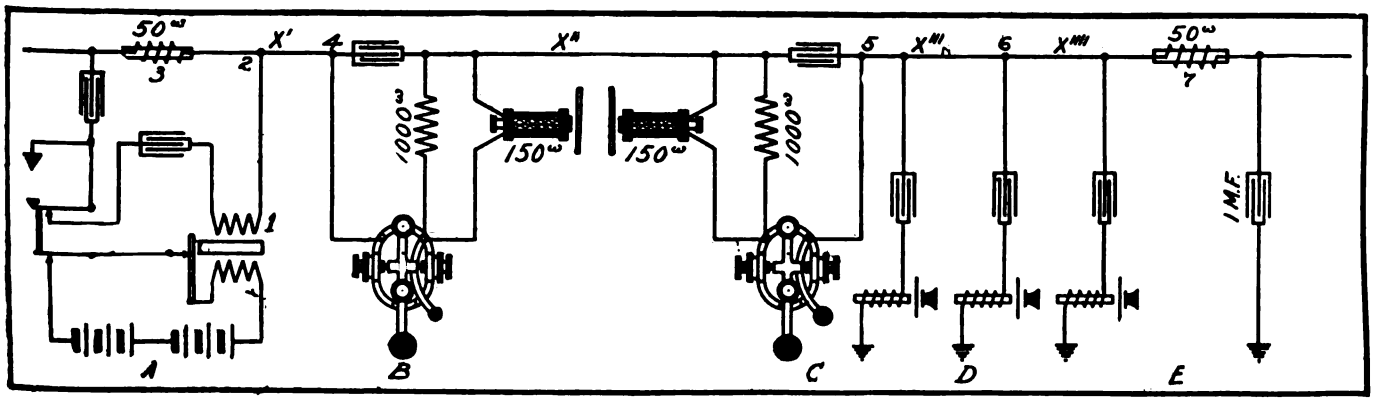

Fig. 3. Elements of circuit shown in Fig. 2 which are necessary to indicate method of calling other telephones from station A.

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have a vital effect upon your personal interests, and that its success rests upon the individual efforts of every operator in the field. The officers of your association must have your assistance if it is to be a success. Bear this in mind, and begin at once to work and plan for a good attendance at the 1908 convention.

Convention Representatives.—We call attention again to the importance of State and Provincial Associations electing their delegates and alternates to the convention without delay and reporting them promptly to this office.

Program and Committees.—Most of the officers of the various associations have already responded to our request for program suggestions and names of members for convention committees. The others should do so immediately. Suggestions will also be welcome from anyone in the field regarding subjects for papers and discussions, as well as special features. Give us the benefit of your ideas.

Convention Advertising.—Telephone manufacturers, supply dealers and others who have been asked to co-operate in a plan for advertising the convention and who have not yet responded, are requested to let us hear from them without delay. It is only a short time until the convention, and the greatest possible amount of publicity is necessary.

Exhibit Space.—The Electrical Trades Exposition Co. requests us to announce that while they have already signed up many contracts for exhibits there are still a number of desirable positions untaken in the telephone section, which can be secured by early applicants. For terms and prices address Mr. Homer E. Niesz, Manager, 1006 Monadnock Block, Chicago.

Special Notice to Operators.—The Association furnishes all Independent telephone manufacturing or supply companies with trade mark equipment "shield" stamps in denominations of 1c., for use on instruments, and 25c. and 50c. for switchboard sections, the latter to be applied at the rate of 1c. for each drop. These stamps on the equipment you purchase are evidence that your dealer is contributing to the support of your Association.

To District and State Associations.—There are undoubtedly quite a number of Independent operating companies in the organized states which are not yet members of their respective district associations. The officers and members of such associations should devote their energies to bringing in these non-member companies, for the good of such companies themselves and with a view of strengthening the state organization. A little personal effort on the part of the officers and members will accomplish results of lasting benefit along this line. Take the matter up at once and see how many new members can be enrolled before the convention. Work could also be done to good advantage in organizing new territory. The Association will be glad to co-operate with all interested in forming new associations, by submitting detailed plans, suggestions, etc.

"Shield Bargains."—Up-to-date managers who appreciate the value of a strictly high class modern illuminated sign—one that compels public attention and secures increased business, while at the same time enhancing the appearance of an exchange, and which, for a limited time, may be secured at small cost—will do well to write for particulars regarding *Colonial Lanterns* before our present generous offer is withdrawn.

NINTH DISTRICT, OHIO TELEPHONE MEN MET AT NEWARK, OHIO.

THE annual meeting of District No. 9 of the Ohio Independent Telephone Association was held at Newark, Ohio, Nov. 21.

The business meetings were held in the Newark Trust Company Building and were well attended, all counties in the district excepting two being represented.

The meetings were presided over by Frank L. Beam, president of the Ohio Independent State Telephone Association. Mr. G. R. Johnston, general manager of the Columbus Citizens' Telephone Company, acted as secretary.

A resolution was passed discouraging the purchase of apparatus from the Western Electric Co. by all Independent companies.

Reports and statistics presented before the convention show that there are in Ohio 845 Independent telephone exchanges with 1,723 toll stations and 290,400 telephones in service, interests in the plants being held by no less than 25,311 stockholders.

Officers elected are: Dwight E. Sapp of Mt. Vernon, district vice president, and G. R. Johnston of Columbus, district secretary. Forty delegates were selected to represent the district at the State convention to be held at Columbus in the near future, the date not having yet been selected. Delegates were also elected to the International Telephone Association convention.

The meeting was fittingly closed by a banquet at the Hotel Seiler given to attending delegates, representatives and visitors, by the Newark Telephone Company.

Conduit Laying at Norfolk, Nebraska

By W. J. Stadelman.

MR. THEODORE GARY'S remarks in the last bulletin of the International Association, to the effect that the present Independent telephone construction is of a high standard and far superior to the work that has been done in the past, has prompted the writer to present photographs, accompanied by a detailed description of the manner in which the new Independent underground system is being put in at Norfolk, Neb., a city of 5,000 inhabitants. The plant is being built with capacity to take care of 1,250 lines. About 8,500 feet of conduit is being laid, and while the initial cost over aerial construction seems somewhat great, it is thoroughly believed that the saving in maintenance and the efficiency in service that the company will be able to give will amply repay the stockholders for the additional outlay.

Manholes are of the oval type, laid up with hard burnt brick with cement mortar. The size of each manhole is 4 feet wide, 6 feet long, 5 feet 6 inches deep. One is shown in photograph No. 9. Instead of laying the tile completely in concrete the engineer, Mr. Jno. A. Duncan, formerly of Sioux City, Ia., made an experiment with cement joints which proved so successful that his plan was adopted, and the results seem to be thoroughly satisfactory.

This method of construction shows a saving of from 20 to 25 per cent. in the laying of tile when the comparison is made with complete concrete. It should be said that it is not considered at all necessary in cities under 25,000 inhabitants to give the underground work the same expensive concrete protection that would be necessary in larger cities. Careful tests were made of the tensile strength of the cement joints, which were made of two parts of cement and three of sharp sand, made in the manner shown in photographs Nos. 5 and 7, and they were found not to be lacking in any particular. Of course, the photographs only show the men making an experimental joint, the regular work being done in the ditch. Photograph No. 8 shows two men breaking a two-way joint. The outside dimensions of the tile are 9 by 4½ inches, with a total length of four feet. This same joint stood hardening for three days before its strength was tested. It then took the two men's combined weight of 375 pounds to break it.

In preparing the ditch care was taken that the bottom should be carefully leveled with a square pointed shovel in order to give proper alignment for the seating of the tile. This is very essential when using only the cement joints. Two or three trowelfuls of cement are placed in the ditch at the point where the joint is to come. Upon this bed is placed the perforated metal wrapper, which is three inches wide. This forms the tie,

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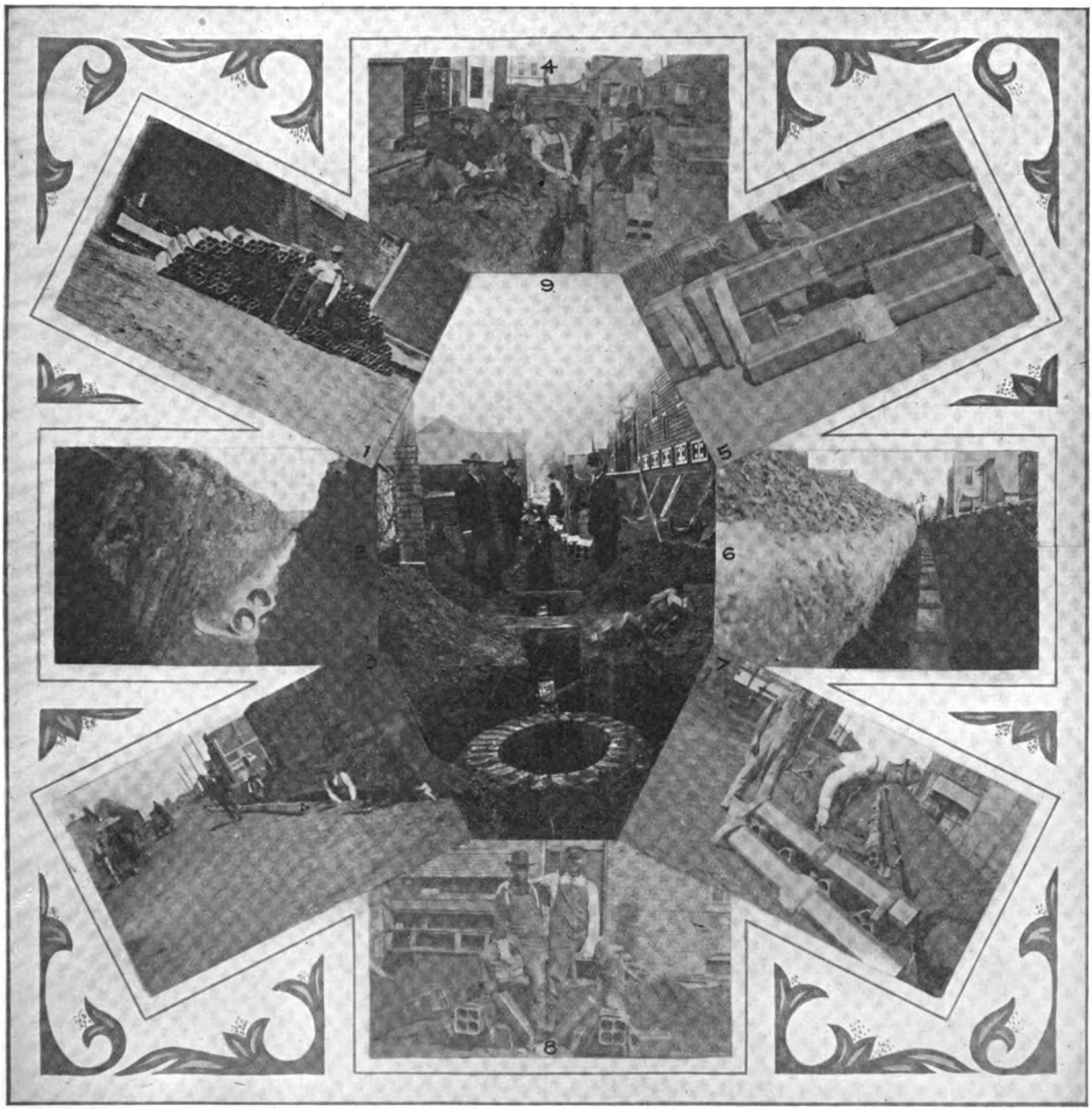
and acts like an expanded metal lath. Upon this is placed the joint of the tile, dowel pins being used. The metal wrapper is then put up around the joint and cinched tight by running the end through the wire loop and folding back smoothly in place. Finally, the cement is troweled over the wrapper to a thickness of about one inch over the center or heaviest place, tapering slightly to about one-half inch in thickness at each end, making the joint eight inches in width. This process is shown by photograph No. 5 of an experimental joint of a four-way duct. In this picture the metal strips may be seen lying across the left hand side of the tile, also one strip at the right hand side in the proper place for the joint. On the center strip you will notice the metal has been cinched up in place, and the mason is in the act of putting on the cement. Attention may be given also to the two-way joint which is completed. This is the same joint that was afterwards broken, as shown in photograph No. 8.

When the cement sets it makes a perfect band around every joint in the tile, so that the entire run is practically as strong and substantial as a single tile, and for all purposes equally as durable. Especially is this true for service in cities of the same class as Norfolk, where the traffic is light and where the water, gas and sewerage men have little repairing to do and the streets are seldom opened. For the benefit of those who like figures, the cost per duct foot is given as follows: In connection with these it must be borne in mind that labor in an agricultural territory is extremely high during this season of the year, or a better showing could have been made. The cost per duct foot was: Two-way $.109, three-way $.099, four-way $.091, average $.0996. Estimated cost per duct foot where concrete over all is used is: Two-way $.169, three-way $.159, four-way $.151, average $.1596.



1—Engineer Duncan, who laid out the underground plant. 2—Three-way tile, laid in trench. 3—Men laying three-way tile. 4—The noon hour. 5—Making a test joint in four-way tile. 6—The ditch, four-way tile joint in foreground. 7—Making a test joint in three-way tile. 8—Breaking a two-way test joint—combined weight of two men, 375 lbs. 9—Complete four-way run, and manhole ready to receive cover.

TYPICAL VIEWS TAKEN DURING PROGRESS OF CONDUIT TESTS AND CONSTRUCTION AT NORFOLK, NEBRASKA.

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Editorial Comments

SERVICE INTERRUPTIONS.

COMPANIES supplying the so-called public utilities find that the general estimate of the value of their services is based not merely on the extent of the returns they make to their patrons for payments received but on the uniformity and reliability of the service. The public does not merely demand that a high standard shall be set for the operating department, but individuals are ever ready to unite in a storm of protest against lapses which, even though counterbalanced by close attention in ordinary times, produce occasional inconveniences. Electric light companies learned early in their experience that as a business proposition it is better to maintain a considerable amount of normally idle plant than to be confronted with accidents which occasion even brief total interruptions of service.

Not all telephone companies have been successful in inspiring their employees with a proper appreciation of the importance of this matter, so that they will always put the public interest ahead of considerations affecting their own personal convenience. Many a telephone man without actual training in a department where he has to listen to complaints is too prone to do certain branches of his work in the way which is easiest for himself, and say that it is easy enough for the subscribers to wait a few minutes. An instance in point which we recall is that of a cable foreman who in a moderate sized but very busy town kept most of the telephones out of service for nearly a whole day. The occasion for this was a removal of the central office to a new location, necessitating cable cutovers. A small amount of money could be saved by making the cutover during the day. The main consideration in this case, however, was that night work would be wholly avoided, and as the cable foreman was getting to that stage in life where an easy time made a strong appeal to him, the day cutover was the only thing he cared to consider. Accordingly a few of the principal business men were told to put their messages through early in the day, as the telephone office was going out of business for a few hours. Other people were allowed to turn the crank as many times as they pleased until they learned from rumor that the office was being moved.

Of course, a man who does a thing like this is likely enough to think he is a thoroughly loyal and careful employee of the telephone company. As such he is quick to say, as an excuse, that he considers the convenience of the company to be as important as that of its subscribers, and call that a sufficient justification. He is, in fact, prone to forget, as soon as the affair is completed, the influence of his own desire to avoid hard work and saddle the whole burden on his superiors to bear. They have usually had enough experience to convince them that in cases of interruptions it is almost a certainty that some one will need to use the telephone for urgent business. A single delayed call for a physician from an outlying district is capable of arousing against the management of a telephone exchange more enmity than can be allayed by a year of careful atttention to the wants of subscribers.

Failure to handle these emergency calls is of all things the one which cannot be atoned for by explanations. It produces a real injury, and arouses a spirit of dissatisfaction and antagonism which is bound to spread. Sooner or later an occasion is sure to come up when all the feeling of this character which exists will work to the material injury of the company. It is the cause of more than half the unfavorable agitation in cases of applications for modifications of franchises, matters affecting rates, and innumerable minor relations with property owners and city officials from whom the company seeks rights of way and permits to use streets in the ordinary course of construction.

When the true situation is made to appear to employees they are quick enough to see where the real interest of the company lies, and try to create and maintain the good will which is so substantial an asset. A man who has the importance of this matter firmly fixed in his mind avoids many of the little faults which otherwise occur. If he has to repair a line drop or relays and the work will take more than a few moments he knows enough to cross-wire the line to a spare jack, and see that the operators are notified so that they can temporarily switch incoming calls to the subscriber. A lineman calling in for a test will cheerfully release the line to a subscriber, instead of trying to coax or scare him off. In handling these little things correctly he gradually fits himself for taking the fair and business-like ground in larger affairs, and makes his value to the company greater than can be measured on the basis of mere mechanical skill.

OUTFIT INSPECTIONS.

EACH class of work on the wire plant and equipment of a telephone company is performed with the aid of certain special tools. Linemen, instrument setters, troublemen, all have their special kits, which might be imagined to be such as individual experience has led them to acquire because best suited to the work they perform. As a matter of fact, however, examination of the outfits of a hundred men engaged in almost exactly the same kind of work will show such remarkable variations in the number of different types of tools, and the dimensions and condition of the specimens brought forth, that it becomes evident that what at first seems a trifling matter is really worthy of comment.

Most telephone companies of considerable size have compiled lists of tools which are considered necessary for men in each department. Men in a great many of the smaller companies have seen such lists and are familiar with them. Too often, in an attempt to cover a rather broad field these lists mention numerous articles which are unnecessary, so that an actual outfit made up in prescribed form would be heavy and cumbersome as well as unnecessarily expensive. The result is that even if a new man at telephone work buys the whole outfit, like a soldier setting out on a long march he frees himself of piece after piece of unessential baggage. Finally he finds his kit reduced to a minimum below which he has discovered that he cannot go and perform his work without borrowing.

Unfortunately, this actual working mimimum is a quantity, as has been mentioned, which varies considerably. This shows clearly enough that each is not a perfect outfit, and the manager who happens around when one of his men is trying to set a two-inch screw with a screwdriver having a shank an eighth of an inch in diameter, with a correspondingly small handle, sees that there is a deficiency which is costing good money. This is one of the things that helps a man to waste time on a job.

It is unfortunate that although enough thought has been given to this subject to cause the arrangement of the lists referred to, the matter has in few quarters passed beyond the theorists to the executive branches of the staff, becoming a subject of practical action. Members of the local forces need to come to an agreement on the outfit of tools and material which each man should habitually carry for the most efficient performance of his work.

Once such a standard is agreed upon it becomes a plain matter of duty for each man to follow it. The ordinary man takes pride in keeping his personal belongings in good shape, and there is no reason why the condition of tool bags should not become the subject of a friendly rivalry which will be helpful in a company's work. This is assigned as a reason for occasional critical inspections of each man's outfit. These inspections show not merely what the man has, and how it is kept, but orderliness of arrangement. In fact, their object is to keep the men alert to have everything they will need, and keep it so that it can be grasped ready for use at once, without searching or fumbling. A little inspection drill, along the lines which an army officer or the foreman of a large modern shop will say is calculated to instil some of the best elements of of disciplinary training, has a very wholesome tendency to remedy some of this lack of alertness. It is one of the little things that gives a good man a chance to show what he is worth.

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The Telephone and the Law

CONDUCTED BY A. H. McMILLAN.

ELECTRIC TROLLEY AND TELEPHONE WIRES.

On May 3, 1907, a trolley line building through this city ran its feeder between our telephone wires or between the two lower cross arms on our poles and parallel with us for one square, which was within less than one foot of our wires. On above date the feed wires came in contact with our wires and burnt out our system, which took us about one month to put in working order again, at a cost of between $600 and $800.

Our subscribers were out of service all this time, which we had to take off their rents. The traction company did not notify us when they put the current on the feed wire and we knew nothing of it until we were burnt out.

We asked that the traction company pay the actual cost of the damage, which it refused to do, claiming that our men dropped a wire on them and caused the trouble. There was not a man near the place for our company, as all the men were working on the ground and were two squares off and on another line altogether.

The question now is with us. Can we make the traction company pay us for this damage? And did they have a right to run their wires to carry twelve hundred volts through our telephone leads within a foot of our wires? Our poles were about thirty feet high. Their's were about the same length. C. E. G.

UNDER your statement of the affair, you can certainly make the traction company pay you for the damage you have received. It had no right to run its wires, carrying twelve hundred volts of electricity, through your line within a foot of your wires. The subject of interference of street railway and telephone wires has often been passed upon by the courts, and it has always been held that if the electric wires are erected after the telephone line is strung, the electric wires with their heavy current must be kept a safe distance away from the telephone lines. Richmond and P. E. R. Co. vs. Rubin, 47 S. E., 834; Railway Company vs. European E. P. Telegraph Company, 9 Exch. 363; Allens' Telegraph Cas. 8 S. W. Gross vs. Southern Chicago City Railway Company, 73 Ill. App. 217; Hudson River Telephone Company vs. Railway Company 135 N. Y. 393 4 Am. El. Cas. 276; State vs. Railway Company, 87 Wisconsin 72 4 Am. Elec. Cas. 89; Western Union Telegraph Co. vs. Guernsey & Scudder E. L. Co. 46, Mo. App. 120, 3 Am. Elec. Cas. 425; Birmingham Traction Co. vs. Southern Bell Telephone and Telegraph Co. 24 S. 731.

TOLL BUSINESS INVOLVED IN BIG SUIT IN INDIANA.

THE Long Distance Company of Indianapolis has filed suit in the Superior Court to enjoin the Central Union Company from handling or soliciting any long distance business out of Kokomo, Ind., and against the Citizens' Telephone Company, of Kokomo, to prevent that concern from giving its long distance business to the Central Union Company.

The New Long Distance Company, according to the complaint, made a contract with the Citizens' Telephone Company whereby that company was to give to the New Long Distance Company all its toll line business. Things went along well for a time until the New Long Distance Company noticed that its business out of Kokomo was decreasing rapidly. Investigation showed the Central Union Telephone Company "butted in" and was handling much of the long distance business out of Kokomo. The New Long Distance Company promptly asked for an injunction to prevent a continuation of business between the Kokomo company and the Central Union company.

NEW YORK DECISION ON RIGHTS OF ABUTTING OWNERS.

SUPREME COURT JUSTICE MORSCHAUSER, at Newburgh, N. Y., has rendered a decision in the case of the Hudson River Telephone Company against Mary A. Forrestal, of Fishkill Landing. Some time ago the telephone company erected poles for its wires in front of the defendant's property on the north side of Wiltsie avenue, and when the company refused to take the poles down at her command she (through her husband acting as her agent) chopped down two.

The company brought an action against Mrs. Forrestal to recover $100 damages, and wanted her restrained from further interfering with the company's poles, wires and property. The court found that the woman had a perfect right to remove the poles because they were erected on her property.

In his decision the court reviewed the case in a most careful and thorough manner. He awarded the defendant judgment and also $57 costs to be paid by the telephone company. The part of the decision bearing on the conclusion is as follows:

"Where a deed gives the boundaries of the land conveyed by courses and distances, without mentioning a street by which the same is bounded on one side, but where it appears that the distance given does in fact carry the boundary to the street and along it, it is the same as though the boundary were described as running to the streets and along the same, thus extending the title to the centre.

"The description of the land in the conveyance to defendant and the descriptions in conveyances of the parcels lying on the east side of the defendant's premises from the common grantor, satisfy me that the defendant's title extends to the centre of Wiltsie avenue.

"If I am right in this, and the plaintiff is the owner of the fee of the street, subject only to the public right of way, then I do not think the plaintiff can erect its poles in front of the defendant's premises in said street without acquiring the right by condemnation, although it has had permission from the village authorities to do so."

MEMPHIS HAS NO AUTHORITY TO FIX RATES.

A TEMPORARY injunction has been granted by Federal Judge C. D. Clark in behalf of the Cumberland Telephone & Telegraph Company to prevent the city of Memphis, Tenn., from enforcing a recent ordinance passed by the legislative council reducing the company's rates. The telephone company was placed under a $5,000 bond to cover any damages the city might receive, pending the final disposition of the case. The decision of Judge Clark is the first victory for the telephone company in a fight which has been going on between it and the city of Memphis for some time. The proceedings were started by the raising of the telephone rates by the company to $6 per month for telephones. The council passed an ordinance which was intended not only to prevent the company from raising its rates, but to cut its former rate.

The dispute was carried into the state courts. Newspapers in Memphis took up the fight and are said to have advised the patrons of the company not to pay more than the amount stipulated in the ordinance. A bill was then filed in the federal court seeking an injunction against the city to prevent it from enforcing the ordinance. Judge Clark stated in his opinion that he concluded that the city of Memphis was without legal authority to regulate rates in the method attempted to be done in the ordinance. He then quoted from the city charter the paragraph which gives to the council the right to pass, for the government of the city, any ordinance not in conflict with the constitution or laws of the United States or the State of Tennessee. He said that it could not be construed to give the power of rate legislation to a municipal corporation.

LONG PENDING SUIT BETWEEN ROCK ISLAND AND CENTRAL UNION COMPANIES DECIDED.

THE Supreme Court of Illinois has decided the quo warranto proceedings instituted by the city of Moline to determine by what right the Central Union was operating in Moline since its franchise had been repealed. The city affirmed that the telephone company had no right to operate in that city and the company demurred. The demurrer was sustained in the Circuit Court and the Supreme Court has now affirmed the decision of the lower court. The effect of the decision is to defeat the municipality in its attack on the company's rights and franchise.

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From the Telephone Exchanges

MICHIGAN AD VALOREM TAX MEASURE KILLED.

PRESIDENT E. B. FISHER, of the Citizens Telephone Company, Grand Rapids, Mich., is given credit for winning a signal victory over the interests which have been urging the passage of a law to compel telegraph and telephone companies to pay an ad valorem tax. By his arguments he was able to convince the legislators assembled in special session that it would be unjust to the interests he represents to make a change from the present method of assessing a specific tax.

One of his principal arguments before the committee was that the telephone business was in a different category from that of other corporations. A three million dollar mercantile corporation might, for instance, do fifteen million dollars' worth of business in a year. But it is not so with the telephone companies. Their entire year's business is but a small per cent. of the capital invested, and therefore they should not be taxed in the same ratio as other incorporations, that is, according to the amount of money invested.

Another point he raised was that the franchises fixing rates in the different towns in Michigan had been passed when the specific tax was in effect, and that as the company could not raise its rates for telephone service, it was estimated that the company would lose money in many cases if the method of taxation was changed.

KENTUCKY FARMERS OBJECT TO EXTRAORDINARY RAISE OF SWITCHING RATES.

FROM Leitchfield, Ky., comes an interesting report of what the Society of Equity in that town believes is an example of an extraordinary increase in telephone rates. It is said that the rural telephone lines extending over the country have for some time past been receiving connections through the local exchange of the Cumberland Telephone & Telegraph Company for a fee of $2.00 per year. They have now been told that the company cannot afford to maintain this rate, and wishes them to pay $7.50 per year. This rate the farmers refuse to pay; and after conferences, which have not effected any change in the Bell's company's determination with respect to rates, it is said that they are preparing for the organization of an Independent exchange to do their own switching.

THREE MONTHS DELAY IN INSTALLATION BY BELL COMPANY ON PACIFIC COAST CAUSES PROTEST.

REPORTS from Freewater and Milton, Oregon, indicate that the people in these towns will have to organize an Independent telephone company as the only means of obtaining service. It is said that many people signed orders for telephone service a considerable time ago, some of the contracts being nearly three months old. As yet no telephones have been installed, and severe criticism is being made of the company's slowness. It is believed that an Independent company will soon be organized to take care of the demand for service.

UNIFORMITY OF OPERATING METHODS PROMOTED BY MISSOURI DISTRICT MEETING.

MEMBERS of the First District of the Independent Telephone Association of Missouri, met at Maryville, Friday, November 15th, and about 20 men were present.

Traveling Secretary W. R. Barkdull, of Windsor, opened the meeting and presented F. P. Robinson, the Mayor of Maryville, who, in well chosen remarks, welcomed the telephone representatives to the city. A response was made by H. E. Scovern, of St. Joseph, in behalf of the association.

The traveling secretary then outlined the attitude of the State Association, showing the need of district organizations for the systematic handling of the local interests, such as definite territory; the establishment of uniform rates; the better and more systematic methods of bookkeeping and of making toll reports; the use of the Independent emblem, the Shield; the uniform compiling of directories; he also emphasized the importance of keeping alive the district meetings, from which the State and National Associations derive their strength.

H. C. Todd, the president of the District Association, presided over the business session and the handling of the routine work.

A question drawer was one of the features of the convention, and many interesting things were brought out, relating to rates, switching charges for rural lines, the attitude of mutual farmer lines, and many subjects affecting local companies.

Manager H. C. Todd was complimented upon his up-to-date exchange, and also the generous manner in which he entertained the visiting members.

The evening session was entirely given over to informally discussing "telephone men's troubles."

WASHINGTON, PA., SEES THE LAST OF FEDERAL SYSTEM.

EXCHANGE after exchange of Fred De Land's Federal Telephone Company of Pittsburg has been closed since the exposure which made it impossible for him to carry out his original purpose. Unable to continue in the telephone business on a legitimate basis and with no hope of materially weakening the position of the Independent companies in the vicinity of Pittsburg, the service of the Federal company was allowed to gradually deteriorate until there was absolutely no excuse for its existence. From time to time it has withdrawn from one town and then another, and recently took the final step toward abolishing its system in Washington, Pa. There it has surrendered all its rights and franchises, has given up its central office, and taken down cables, wires and poles.

MICHIGAN INDEPENDENT MANAGERS MEET IN BATTLE CREEK.

THE annual meeting of the Michigan Independent Telephone Managers' Association was held Nov. 13 in Battle Creek. Several interesting papers on telephone matters were read.

The new officers for the ensuing year are, President, William Robinson, Muskegon; Vice-President, H. T. Clough, Owosso; Secretary-Treasurer, A. A. Burch, Battle Creek.

Figures produced at the session showing the growth of the Independent Telephone business in Michigan were a pleasant surprise to every one. It was shown that Michigan now has 112 Independent companies, 333 Independent exchanges, 78,494 telephones, 10,300 stockholders and 897 toll lines.

Detroit, through Mayor Thompson, entered a plea for the 1908 meeting, but the decision will rest with the executive committee.

ARGUMENTS FOR AN INCREASE IN RATES AT FRANKLIN, IND.

SINCE November 1st the subscribers of the Franklin Telephone Company, of Franklin, Ind., have been placed on a new rate schedule. The reasons for this increase were admirably stated in common sense terms by F. R. Strickler, secretary and manager of the company, in a circular which was recently sent out. He called attention to the fact that when the company first began operating its exchange in Franklin there was little or no demand for rural service, and no thought of making what is now practically a county system. At the start the rates were $1.50 per month for residences, and $2.00 per month for business service. Later on a voluntary reduction of residence rates to $1.00 per month was made. The subsequent demand for rural telephones and the popularizing of telephone service has increased the size of the system until the company is to-day giving service to three thousand telephone users, instead of less than five hundred located mostly in the city of Franklin, as it did a few years ago.

The company states that the cost to operate telephones under the present conditions is double what it cost when it was called

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upon to give only a city service. It calls attention to the fact that the larger service is worth a great deal more to the individual subscriber, and that this is evidenced by the increasing average number of calls for each telephone connected with the switchboard. With this brief reference to the fact that it costs more to operate the exchange on account of its increased size, the company makes an announcement of the increase of its rates to the following figures: Rural rates, $1.50 per month on a residence party line; $2.00 per month on a business party line; city of Franklin: $1.50 per month on an independent residence line; $1.25 per month on a two-party residence line, and $2.00 per month on an independent business line. As a further suggestion to the farmers on the rural lines, a circular is enclosed to show comparative prices, made up in the following manner:

PRICES COMPARED.

When we began operating a telephone plant in Franklin, 10 years ago,

WE PAID—	NOW WE PAY—
57cts. per bushel for wheat.	96cts. per bushel for wheat.
30cts. per bushel for corn.	65cts. per bushel for corn.
25cts. per bushel for oats.	55cts. per bushel for oats.
$3.00 to $4.00 for hogs.	$5.00 to $6.00 for hogs.
$2.50 to $3.50 for cattle.	$4.50 to $5.50 for cattle.
$8.00 per ton for hay.	$16.00 per ton for hay.
$1.00 per cord for wood.	$2.25 per cord for wood.
$2.60 per ton for coal.	$4.25 per ton for coal.
10cts. per pound for butter.	25cts. per pound for butter.

This is the kind of logic that there is no getting away from, and objections from fair-minded subscribers are completely forestalled.

BELL COMPANY SUPPOSED TO BE WITHOUT A FRANCHISE IN JOPLIN, MO.

THE Bell Telephone Company operating in Joplin, Mo., was recently brought up with a turn when it endeavored to get permission to set guy wires on Main street. It seems that in July, 1906, according to the statement made by one of the councilmen, the company was granted a franchise to put all of its wires in conduits under the streets, with the provision that within six months all overhead wires should be removed from the Main street. City councilman Humes claims that since the expiration of this time the wires have not been removed and no continuance has been requested, the ordinance is forfeited. Much indignation was expressed when the governing body was made aware that guy wires were being strung, and the matter was referred to the city counselor, with a request that if he found that the company had not lived up to its contract a movement be undertaken to formally declare its franchise forfeited.

NASHVILLE'S NEW MAYOR LOOKING UP BELL METHODS OF DOING BUSINESS.

MAYOR BROWN of Nashville, Tenn., has written the Cumberland Telephone & Telegraph Co., propounding a long string of questions regarding its service, rates, contracts with the city, equipment, and numerous other things. Thus far the company has given no reply, but the mayor has in the meantime declared himself. Mayor Brown proposes to require the Cumberland company to reduce its rates in certain instances and to pay the city a reasonable tax with no strings tied to the contract.

Two years ago the old city administration in Nashville practically gave the Cumberland company an exclusive franchise by assessing the company $10,000 per year as long as there was no competition in the local field. This was at the time the franchise of the Home Telephone Company was pending in that body. The Home franchise was defeated and the company is still unable to push its construction work in Nashville. The law passed by the last legislature giving telephone and telegraph companies right of way over all streets and public roads without the consent of city and county authorities seems to avail the company nothing, so firmly has the Cumberland company held things in Nashville. The new mayor has just been elected, however, and he has asked the Home company for a statement of its plans and assures the management that it will have fair dealing at his hands. The State law provides that the city may exact certain taxes and may regulate rates of telephone companies. When the Home company made its application for a contract with the city the administration would not reply to the proposal and matters have stood there for over a year. The new mayor says he will give the Home company a liberal contract and see to it that it can get into the conduit system in which all wire-using concerns must place their wires. After three years of fighting it now appears probable that the Home company will now get into Nashville, although a bill is now pending in court testing the validity of the telephone law passed by the last legislature. The public is decidedly with the Home company, but so far has been unable to control the two administrations that were supposedly elected because of their favoring telephone competition.

BOOK REVIEWS.

Harper's Electricity Book for Boys. By Joseph H. Adams. 407 pages, numerous illustrations. Published by Harper and Brothers, New York. Price, cloth binding, $1.75.

While this book was written primarily to give boys a practical working knowledge of electricity, there is much information contained between its covers that will prove of interest to the grown up as well. Everyday uses of electricity are explained in a manner that any one can understand and that will create a desire to try some of the many experiments shown, which may be made with home-made apparatus at small cost. Care has been taken throughout to show the simplest and most inexpensive way of choosing materials and securing results.

Subjects such as the Telephone, Wireless Telegraph, Electric Light and Power are dealt with in terms so simple and non-technical that they can be readily grasped by the novice.

It is a book well worth placing in the hands of every boy inclined in the least toward affairs electrical.

Writing for the Press. By Robert Luce. 300 pages, published by Robert Luce Co., 68 Devonshire St., Boston, Mass. Price, $1.00.

This book contains much genuinely valuable information in relation to the arrangement and the general preparation of manuscript together with information in relation to the printing end of the publishing business. It will prove of great value to any person who contemplates or is now writing articles for publication. Telephone men who have in mind ideas that will be of value to other men in the field but who hesitate to submit them to publishers of technical journals because they do not feel that they can write acceptable articles, will find this book a great help.

Power Stations and Transmission. By George C. Shaad, E. E. 74 pages, numerous illustrations and tables. Published by American School of Correspondence, Chicago, Ill. Price $1.00.

This book contains a general summary of practical points in the design and operation of power stations. For those men who are interested in electrical matters outside of their own immediate requirements it offers an opportunity to obtain, in a brief form, knowledge of some of the more simple and common problems involved in the transmission of power, and will also enable a man to recognize the functions of the various pieces of apparatus he is likely to see in a modern power station.

The Electric Telegraph. By Chas. Thom and A. Frederick Collins. 138 pages, numerous illustrations and tables. Published by American School of Correspondence, Chicago, Ill. Price, $1.

This book takes up the subject of the Telegraph from the viewpoint of the beginner and goes along by easy stages from the ground principles to the most complicated devices of multiplex and wireless telegraphy. The use of commercial office methods, codes, ciphers, etc., is shown very ably.

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Ways and Reasons

ELECTRICAL UNITS.—(946.)

In reading a recently published book on electricity I find in some places the unit of resistance is spoken of as the ohm, in others as the international ohm, and in still others as the legal ohm. Will you kindly print in your Questions and Answers page the definitions of these three units?

V. W. T., Arkansas.

THE definition usually given for the ohm is that resistance through which a force of one volt will push a current of one ampere.

The international ohm is the definition of the unit of resistance agreed upon by the delegates to the International Congress of Electricians held in Chicago in 1893, and is as follows:

"As a unit of resistance, the *international ohm,* which is based upon the ohm equal to 10^9 units of resistance of the c. g. s. system of electromagnetic units, and is represented by the resistance offered to an unvarying electric current by a column of mercury at the temperature of melting ice, 14.4521 grammes in mass, of a constant cross sectional area and of the length of 106.3 centimeters."

The definition of the legal ohm which is the definition determined and enacted in an act approved July 12, 1894, in relation to the legal definitions of the electrical units in the United States is:

"The unit of resistance shall be what is known as the international ohm, which is *substantially equal* to one thousand million units of resistance of the centimeter-gram-second system of electromagnetic units, and is represented by the resistance offered to an unvarying electric current by a column of mercury at the temperature of melting ice, fourteen and four thousand five hundred and twenty-one ten-thousandths gram in mass, of a constant cross sectional area, and of the length of one hundred and six and three-tenths centimeters."

WHEATSTONE BRIDGE GROUND TEST.—(947.)

Please state in an early number of your paper the amount of battery to use when making a ground test with a Wheatstone Bridge. Also show how this test is made, giving complete diagram of circuit and formula.

W. E. A., Conn.

IN making a test for ground with your Wheatstone Bridge, it will be well to use all of the battery included in your Bridge set in order to secure as large a deflection as possible.

In making this test as well as making tests for crosses in your lines, it will be found that the Varley loop method will in all probability give you the best results.

In Figure 947 the connections of your bridge to the line are shown very clearly. In this figure, A and B represent the arms of the Wheatstone Bridge. R represents the adjustable resistance, S' and S'' indicate the leading wires; c the good conductor, and b the faulty or grounded conductor. By using this method the resistance of the bad conductor as far as the trouble

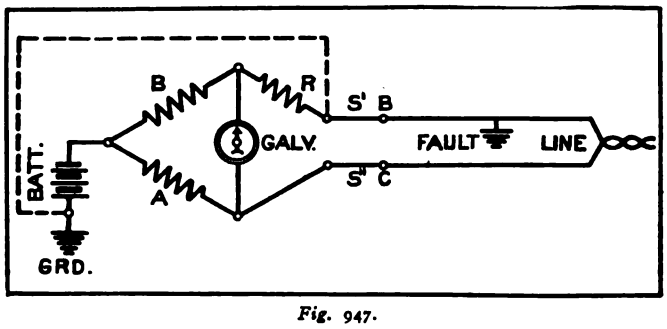

Fig. 947.

is obtained. Then dividing this resistance by the total resistance of the faulty wire a ratio is obtained which when multiplied by the length of the faulty wire, gives the distance to the trouble.

To secure the resistance to the fault, adjust R after making the connections as shown, so that the galvanometer is not deflected. Make note of the values of A, B and R. Then measure the combined resistance of S' b, c and S''. This you will do in the customary manner of Wheatstone Bridge measuring, con-

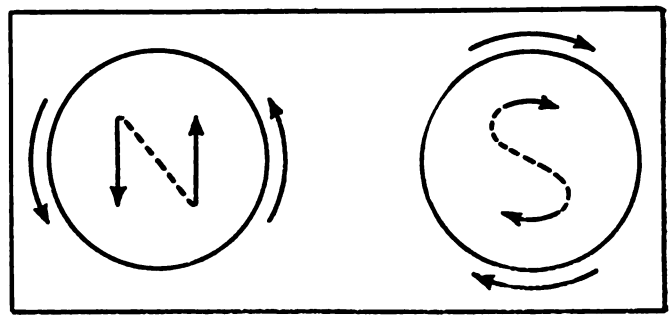

Fig. 948.

necting the bridge as shown by the dotted line to the battery and disconnecting the ground from the battery.

In this case r will equal the combined resistance and A the resistance of the conductor as far as the fault. Then a will equal

$$\frac{B \times r - A \times R}{A + B} - S'$$

The resistance of S' is measured in the usual way. By reversing the lead wires S' and S'' at the terminals of the bridge, a check reading can be secured. In this case let A' B' and R' represent the new resistances required to balance the galvanometer. Then

$$a = \frac{A \times r + R'}{A' + B'} - S'$$

and the distance to the fault $= \frac{a}{b} \times L$ where b equals the resistance of the bad wire.

Where the good and bad wires are of the same size, the length and value of b is found by taking one-half of the combined resistance of the good and bad wires measured with the Bridge. Then using the letters previously indicated, we have

$$b = \frac{r - (S' + S'')}{2}$$

Where the conditions are such that it is impossible to secure a good wire of the same size and length as a bad wire, we will consider L' as equaling the length R' and rated resistance per thousand feet of the bad wires, L'' being the length and R'' the rate of resistance per thousand feet of the good wire, then

$$b = \frac{L' \times R' \times (r - (S' + S''))}{L' \times R' + L'' \times R''}$$

The values of R' and R'' can be readily found by reference to wire tables giving the length and resistance of iron or copper wire, according to your case.

TO DETERMINE POLARITY OF MAGNETS.—(948.)

Will you kindly suggest a simple manner in which I can readily determine the polarity of a magnet by the direction of the windings and flow of current? I have seen several of these, but have not run across one of them that has fixed itself firmly in my mind, as they are a trifle too complicated.

W. S. R., Michigan.

DIFFERENT plans have been suggested at various times in order to fix in mind the direction of the current required to produce north and south polarity. A very simple rule is indicated in Fig. 948 where the direction of the currents required to produce north and south poles can be remembered from the direction of the arrows at the points of beginning and ending of the capital letters N and S. Here it will be seen that in order to produce north magnetic polarity the current must circulate counter-clockwise, while to produce south magnetic polarity it must circulate in the opposite direction or clockwise.

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Recent Telephonic Inventions

TELEPHONE SYSTEM.

William W. Dean, patent No. 869,067, October 22, 1907, assigned to Kellogg S. and S. Co.

This invention relates to the provision of an automatic ringing device in cord circuits. When the operator plugs into the subscriber's line, the operation of the supervisory relay throws on to the line current from the ringing generator. The removal of the subscriber's receiver from the hook causes additional current to pass through a special relay inserted in the ringing circuit, thus operating it to disconnect the ringing current from the cord strands. A locking winding keeps the ringing current off the line until the relay is released upon the withdrawal of the plug from the jack.

LINEMAN'S SAFETY DEVICE.

William F. Newton, Spokane, Wash., patent No. 869,382, Oct. 29, 1907.

This device comprises a curved plate having two downwardly projecting spurs on its concave side and a hand grip at each end. Straps are attached to each end of the device and pass to a belt fastened around the waist of the lineman climbing the pole. A pivoted arm on the outside of the device carries a roller which is adapted to pass through an opening in the pole and extends beyond the spurs in order that the spurs may not engage with the pole excepting during such time as is desired by the climber.

MOUTH PIECE.

A. Bebout, St. Louis, Mo., patent 871,468, November 19, 1907.

This invention contemplates an arrangement for a special telescopic mouth piece, provided with covers, and intended to be carried in the pocket and affixed to the transmitter of any telephone which the owner may wish to use in a sanitary manner.

TELEPHONE EXCHANGE SYSTEM.

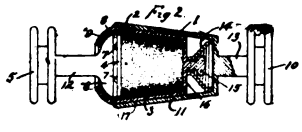
N. E. Norstrom, Chicago, patent 871,520, November 19, 1907, assigned to C. L. Redfield, Chicago.

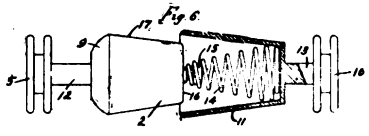
This patent relates to a system of making conections to operate selective lock-out party lines. Connected to a party line terminating in a jack adapted to receive a plug, in the ordinary manner, are a series of local stations, at each of which is a circuit controlling mechanism, which may be operated on the step by step principle.

ELECTROTHERMAL PROTECTOR.

F. B. Cook, Chicago, patent 870,714, November 12, 1907.

This device has a cup 2 for holding resistance material 1. Insulation 3 is placed adjacent to the inner walls of the cup 2. Normally cup 2 is inserted within cup 11, the two being fastened together by a heat-susceptible cement of low conductivity, forming a film, which on account of its thinness has a very small



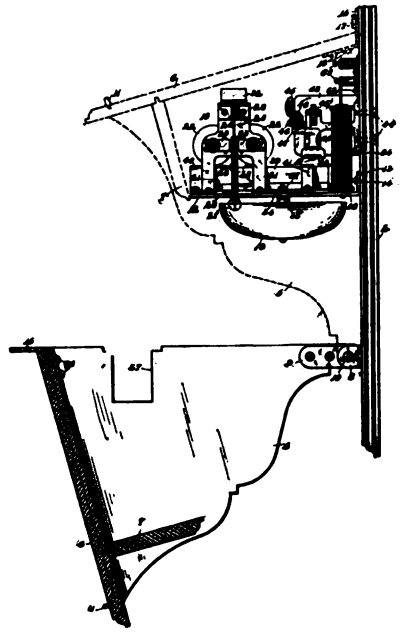


resistance. Terminal 5 is brought into electrical connection with the resistance medium through contact points 7 and disc 4, an intermediate air space 8 being provided to keep the terminal from becoming unduly heated. In operation a strong current heats the material 1, and fuses the cementing film, and the tension of supporting devices draws the two portions of the protector apart, leaving the spiral spring 11, as shown in the lower diagram, to maintain the continuity of the electrical circuit through the device.

TELEPHONE WALL SET.

W. W. Dean, Chicago, patent 871,485, November 19, 1907, assigned to Kellogg S. & S. Co.

As indicated in the illustration, this wall set has its working apparatus mounted upon a shelf 12, preferably of sheet metal plate. The gongs of the ringer are mounted below this plate,



being thus in the open air. The front, sides and top of the cover which normally encloses the apparatus form a box-like structure, arranged to swing on hinges 8, 9. It will be seen that the shelf upon which the apparatus is mounted forms the bottom of an enclosing box when the cover is in its normal position. When the cover is swung down, access may be had to the apparatus from the top, front and right and left hand sides.

SELECTING DEVICE FOR AUTOMATIC SYSTEMS.

Frank A. Lundquist, Chicago, patent No. 871,092; Nov. 12, 1907.

This patent describes a selecting device having a dial provided with numbers on its face and a pointer which is movable to any position on the dial, together with means for automatically restoring the pointer to its normal position during which movement it makes a series of electrical contacts which cause as many electrical impulses to be sent over the line as is indicated on the dial, thus causing an actuation of the selecting apparatus in the subscribers' instruments bringing the desired subscriber in an electrical connection with the line so that conversation may be held thereon.

INTERCOMMUNICATING TELEPHONE.

W. W. Henry, Wollaston, Mass., patent No. 870,168, November 5, 1907, assigned to S. H. Couch, Boston.

This patent covers a type of telephone for intercommunicating systems, arranged to contain within a moderate sized metal box a compact combination of talking and signaling mechanisms and also a new type of circuit switching device. The front of the box is so arranged as to form a double cover, the outer plate of which supports the transmitter. This is attached by a telescopic joint to the inner portion of the cover, securing solidity and strength without a corresponding increase in weight or sacrifice of space. A peculiar arrangement at the base is provided to effect the same results.

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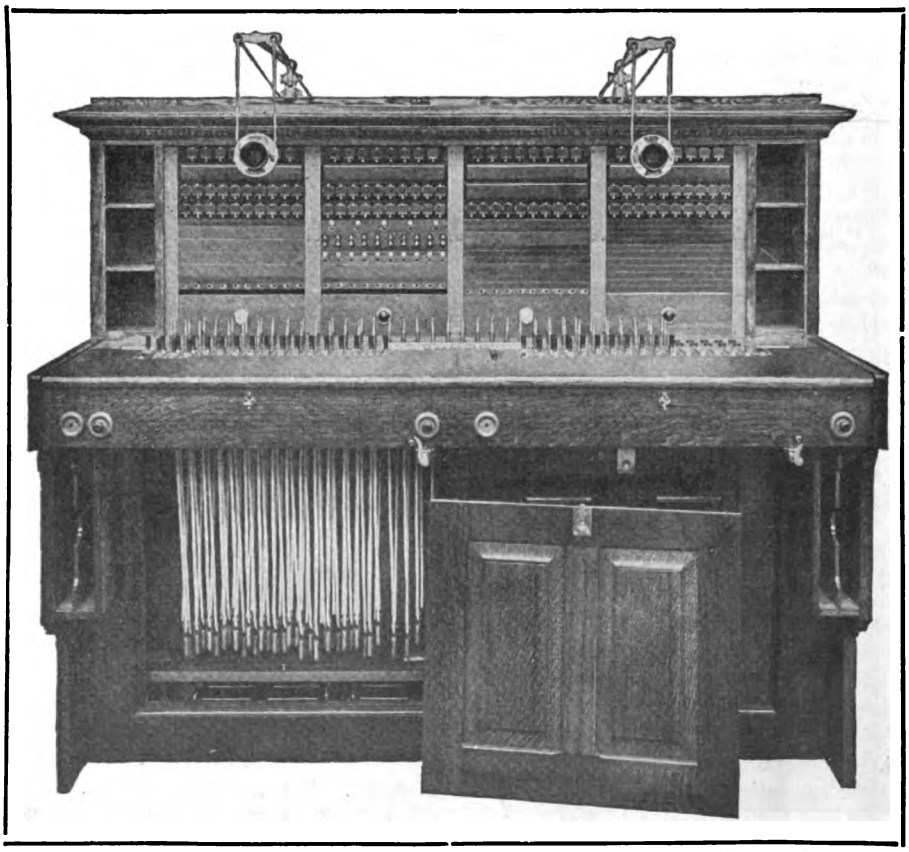
Manufactures and Sales

A FARMERS' LINE SWITCHBOARD.

THE farmers' lines entering the Independent telephone exchange at Dixon, Ill., will be handled over the switchboard shown in the accompanying illustration. Its equipment was installed especially for this purpose by the Stromberg-Carlson Telephone Mfg. Company in standard cabinets bearing the code number A-2474. The board is arranged to work in connection with the Stromberg-Carlson toll and multiple central energy boards previously installed at Dixon. In making up this switchboard the calculagraph panel was omitted, so that the two keyboards might extend the full length of the section. The keyboards used are of the Stromberg-Carlson Company's usual five-ply construction. They have a liberal depth, 14⅞ inches, so that the operators may have ample room for working on toll tickets and other records. Roomy pigeon holes and book stalls are provided at each end of the cabinet.

Protection to the apparatus is furnished by removable panels, which may be taken out to allow of easy access to the wiring on the relays and rear of the terminal board. The method of mounting the repeating coils in a special compartment beneath the cord weights is a point of practical interest, as in this position they may be easily reached, and still are removed from all danger of chance disturbance. Like other standard exchange cabinets of the Stromberg-Carlson Company, this section is equipped with a roomy cable run beneath the condenser shelf. When shipped the board has the cable run enclosed by accurately fitted panels at each end, but these may be easily removed without marring the woodwork to form a continuous run when additional sections are added.

The second position of this switchboard is intended primarily as a night toll position, the main toll board being abandoned during night hours, and all toll lines switched to the farmers' line board. The portion of the face left open will be fitted with night toll switching keys and jacks now in use in the exchange. In this equipment a feature especially noteworthy is the position of the trunks to the toll board, the 10 trunks terminating in cords and plugs located directly in line with the regular answering cords, between the two positions, where they may be conveniently reached by either operator. The supervisory lamps corresponding to these trunking plugs are placed in line with the calling cords, and a designation strip is laid just behind the lamps. The trunks to the main board terminate upon jacks, and are provided with push type ringing keys, as will be seen from an examination of the second position of the board. This equipment comprises trunk circuits to the main board and party line positions from the first operator's position; also trunk circuits to the toll board, five in number from each position. Three cord circuits with repeating coil and key are provided at each position, and of the cord circuits without repeating coil and key there are twelve on the first position and seven on the second. A line pilot circuit, standard operator's circuit and generator and ringing pilot circuit are provided, as well as five order wire circuits; a key for switching the two positions together, and a night bell circuit complete the equipment.



Board Especially Arranged for Handling Farmers' Line Traffic by Stromberg-Carlson Company.

Companies who are looking for proper methods of handling business under conditions similar to those obtaining at Dixon can obtain full information about equipment suited to their needs by writing to the Stromberg-Carlson Company.

AN INDEPENDENT TELEPHONE PLANT.

THIS is the title of a little booklet just issued by the Dean Electric Co., of Elyria, Ohio. It starts out with a short resumé of conditions which led to the organization of the Dean Company, and continues with a detailed account of the designing of the apparatus, organization of the executive, selling and manufacturing departments.

To show the growth of the company's business, the book states "The Dean organization demonstrated its capacity and strength by designing and manufacturing and marketing within a year every type of sub-station and exchange equipment—multiple and non-multiple, magneto and common battery—and a complete selective ringing party system including the Dean Harmonic Converter. Within two years after the first deliveries, 557 small boards of magneto, non-multiple and private branch exchange types have been sold, as well as toll multiple jobs like the Cleveland toll equipment for the United States Telephone Company. The Dean Company secured the largest telephone contract ever placed, covering common battery, multiple central office and subscribers' station equipment to supply 25,000 lines for the Detroit Home Telephone Company."

Continuing the book says: "For the third time within the three years of its existence the Dean Electric Company has made a large addition to its plant. The present addition is a separate three-story building of modern mill construction. With the completion of the new building the company doubled its plant, both floor space and equipment, the expenditures for productive labor were increased over 60 per cent., and the entire output of apparatus was almost trebled."

The booklet concludes with a reference to the company's bulletins setting forth the new plant's product and quotes the head of the electrical engineering department in a prominent Western uni-

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FOR SALE—Telephone exchange, 500 subscribers, new American switchboard, 5,000 ft. of cable, all in good condition; a bargain if sold soon. Address T. M. Sheaff, Fullerton, Neb. 980

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

IF needing an all around Telephone man with ability as electrician and manager write me. Nine years' experience as Manager and Engineer. Dividends and satisfaction guaranteed. Address Box 978, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 978

WANTED—Position as general foreman for telephone manufacturer of instruments or inside wiring or line construction; can give best of references, also refer to the company I am now with. Address Box 979, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 979

WANTED—Six good common battery switchboard installers. Give reference and state fully experience. Also state rate of wages per hour expected. National Telephone Co. of West Virginia, Wheeling, West Va. 962

WANTED—$5,000, 5 to 10 years' time, 6 per cent. interest. Interest payable annually or semi-annually. Security gilt-edge. Address Box 945, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 945

CABLE SPLICER wants position. Several years' experience in Telephone, Telegraph and Power Work. Best of references. South or West U. S. preferred. State wages, etc. Address Box 942, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 942

WANTED—Position. Thirty-three years of age, with 4 years' technical training; 7 years' practical experience, from hole digging to Long Distance Construction, Exchange Installation and Management. Address Box 943, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 943

EXPERIENCED telephone accountant and auditor desires position with more room for advancement. Can systematize your business and give you results. If looking for thoroughly reliable and competent man, I can suit you. Address, Box 963, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 963

WANTED—Position with progressive Independent telephone company by competent man having nine years' practical experience. Address G. W. Kent, 330 East Rich street, Columbus, Ohio. 966

WANTED--Continued

WANTED—Fifty students for instruction in Practical Telephony by experienced engineer. Student graded according to present knowledge. Special price now fifty cents per lesson. SCHOOL OF TELEPHONY, Box 1133, Oklahoma City, Oklahoma. 965

WANTED—Position as cableman by man with 3 years' experience. Permanent location preferred. References given. State salary. Address Box 970, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 970

POSITION WANTED as Superintendent or Manager of growing company in the East. Five years' experience in all branches. Best references. Address Box 971, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 971

POSITION WANTED by switchboard and instrument man; 11 years' experience on magneto systems. good reference; temperate, age 24. South or Southwest preferred. Address Box 964, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 964

EXCEPTIONAL business opportunity for practical telephone man with some capital to invest in new construction and manage an Independent telephone system of exchanges, toll lines and 500 'phones connecting six towns in a growing, prosperous wheat and timber country. Address 315 Empire State Building, Spokane, Wash. 967

Square Washers

We manufacture square washers of all sizes and can quote you Rock bottom prices on both plain and galvanized. Write for prices.

HALLETT IRON WORKS

Manufacturers of Telephone and Telegraph Construction Material

92-96 W. Polk Street, - CHICAGO, ILL.

BUY BELDEN RECEIVER AND DESK-STAND CORDS

Our No. 3 Catalog makes it easy to order Belden cords. Every kind of telephone cord is explicitly described with pictures showing each arrangement of tips, clips, stay cords and terminals.

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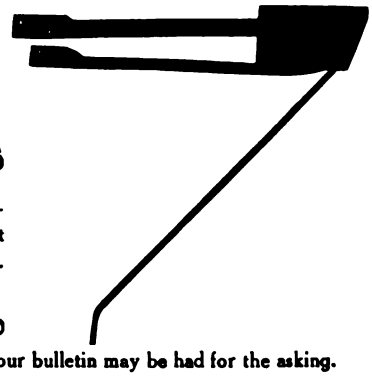
$1.00 YANKEE Pole Seats



made of 1½ in. angle iron, painted with a weather proof asphalt paint, to which is bolted a 1½ in. seasoned, creosoted pine seat,

Strong—Durable—Cheap

Other specialties described in our bulletin may be had for the asking.

The Telephone Appliance Co., Minneapolis, Minn.

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Manufactures and Sales

versity as saying: "These publications are unusually lucid, giving the information desired rather than the loose glittering generalities which usually characterize trade literature."

The company states that a request for this book on the stationery of a telephone operating company or enclosing a business card will receive considerate attention and a prompt reply.

COMPACT MAGNETO INSTRUMENTS.

THE name for the new magneto telephone set manufactured by the Swedish-American Telephone Company appears to be fully warranted by its design. It is called the "Economist," because it uses up so little wall space. One of the

The "No. 66 Economist" Compact Type Magneto Telephone, Designed by the Swedish American Telephone Co.

accompanying illustrations shows the instrument closed, and a comparison of the over-all dimensions with the diameter of the transmitter shows how compact it is. The working parts of the instrument have been assembled in such a way that, while no space is wasted, plenty of room is provided for doing all necessary work. The Economist telephone is furnished in either three bar series, four or five bar bridging, with or without condenser, with or without push button device for non-interfering service, three bar selective, or, in fact, for any class of magneto service that may be desired. The cabinets are made of quarter sawed oak, with a piano finish. The result is an instrument which in appearance, solidity of construction, durability of parts, accessibility for maintenance work, and other important features, thoroughly conforms to the Swedish-American standard, and has new good points all its own.

The manufacturers state that they are prepared to make prompt deliveries of any number of these instruments made up and wired for service that will best suit the individual requirements of purchasers. On account of the economy of space made possible by their use, and their pleasing appearance, combined with the quality of the apparatus, the company expects that these instruments will jump into immediate popularity.

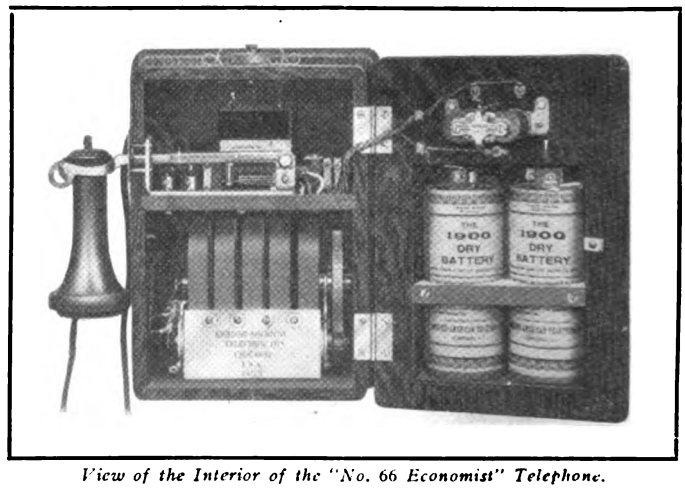
These instruments will be shown, with other Swedish-American apparatus, at the Chicago Electrical Show, January 13th to 26th, 1908. An exceedingly interesting display will be made, and many telephone men have already notified the company of their intention to make a special inspection of its apparatus. Information about the Economist, or any special types of telephones desired for various classes of service will be cheerfully furnished by the Swedish-American Telephone Company, Chicago, Ill.

"STROMBERG-CARLSON" A TRADE MARK.

THE Stromberg-Carlson Telephone Mfg. Company, Rochester, N. Y., and Chicago, Ill., filed on May 22d, 1905, an application for registration of a certain trade mark for electrical instruments. In accordance with the trade mark laws, the Commissioner of Patents has issued, under date of November 12th, 1907, patent No. 66,210, officially creating the words STROMBERG-CARLSON a trade mark, which has been in actual and exclusive use as a trade mark of the applicant, and its predecessors, from which it derived the title, since July 1st, 1894. The trade mark reproduced herewith has been made to indicate not only the character and quality of the business, but the personality of the house it represents. Its use in advertising the products of the Stromberg-Carlson Mfg. Company has been an important feature, and old customers and telephone people in general have learned to associate the words "Central Energy" with the products turned out by this company.

THE AMERICAN CONDUIT CO., 140 Nassau street, New York, has issued the fourth postal card bulletin in the series giving concrete costs. This time it gives a curve for cost of sand in concrete mixed according to each of four given proportions. In making up the curves the cost of sand per cubic yard, in dollars, is plotted vertically, and the cost of sand per cubic yard of concrete, in dollars, is plotted horizontally, so that when the cost of the sand is known and the proportions of the mixture, one has only to follow the vertical line upward until it intersects the curve to know the cost of sand per cubic yard of tamped concrete. This bulletin in connection with Nos. 215, 217 and 220, on the cost of labor, cement and stone, furnishes a very interesting and useful group for the notebook of every manager or construction superintendent.

THE FAHNESTOCK ELECTRIC COMPANY, 129 Patchen avenue, Brooklyn, N. Y., is introducing a new type of test opener, which is simply an adaptation of its familiar spring binding post. A very strong spring metal is used for this opener, which gives a powerful spring contact, said to insure a good connection under all climatic and weather conditions. The device is made in copper for connecting copper wires, or galvanized for iron wires, and half copper and half galvanized for connecting iron to



View of the Interior of the "No. 66 Economist" Telephone.

copper wires. A sample will be sent free on application to the company.

TELEPHONE MANAGERS contemplating the construction of new lines should send for the catalogue and price list issued by MACK & COMPANY, Rochester, New York, manufacturers of the D. R. Barton drawing knives, axes, framing chisels, etc.

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Banks and Trust Companies ADOPT THE EASOPHONE

The irresistible demand forced action. These men would have it.

The officers of several banks and other financial and mercantile institutions whose office equipment must include the most efficient, convenient and attractive telephone apparatus, after a careful examination of the desk type Easophone, instructed the operating company to provide same.

Short-sighted managers refused Irresistible demand.

The subscriber bought and installed the Easophone.

All want them now.

Even the aforesaid managers.

The Company buys the Easophone and

The Company reaps the harvest from new subscribers and new extension contracts.

Write for our offer.

THE WIRE & TELEPHONE COMPANY OF AMERICA, ROME, N. Y.

Manufacturers of telephones, telephone supplies, bare copper, magnet, office, annunciator, weather proof and rubber covered wires.

See our exhibit at the Electric Show, Chicago, Jan. 13-25, 1908.

FOR INSIDE WIRING

CIRCULAR LOOM

Can be used extensively in making cables. By using single wires to the number required and inserting them in a section of **Circular Loom** of the required length, a strong, durable, weather-proof cable is secured.

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Were you to lose a fraction of a minute charge on each toll message every day in the year, the sum total would be astonishing.

That is exactly what happens through the "pencil and clock" guess method of timing.

The CALCULAGRAPH records these lost seconds and turns them into dividends.

IT MAKES NO CLERICAL ERRORS

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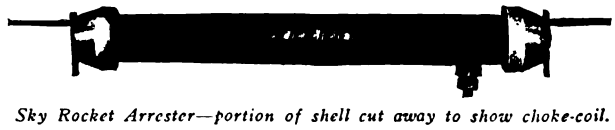
Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.

Built to Meet Every Condition

That may arise during lightning storms, on telephone and telegraph lines.



Sky Rocket Arrester—portion of shell cut away to show choke-coil.

SKY ROCKET ARRESTERS

Will effectively take care of any excessive potential charge on your lines and thus effect savings that will, in the course of a year, exceed many times their cost.

Write to-day for sample.

CHANCE MFG. CO.
Centralia, Mo.

See Our Exhibit, Chicago Electrical Show, Jan. 13-25, 1908

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Messages of the Week

NEW COMPANIES.

PRINCETON, ILL.—Plans are under way for the formation of a new toll line company, whose purpose it is to construct a line between Princeton and Peoria. Initial steps towards this end have been taken by a committee composed of O. A. Cole, of the Bureau County Independent Telephone Company; F. M. Ashe, of the Kewanee Independent Telephone Company; J. S. Daily, of the Chillicothe Independent Telephone Company; E. R. Conklin, of the Interstate Telephone Company, of Aurora, and C. A. Camp, of the Henry Independent Telephone Company, and recommendations submitted that the company, which is to be known as the Shield Long Distance Company, should be incorporated with a capital stock of $25,000. It is expected that work on the line, which will give connections to Kewanee, Bradford, Henry, Chillicothe, Princeville, Aurora and a number of other cities, will be commenced early in January, 1908.

DOUGHERTY, IA.—Arrangements are being carried on at this city for the organization of an Independent telephone company, which is to connect with the Rockwell Farmers' Telephone Company, of Rockwell. D. Cahalan, of Mason City, and others, are taking an active interest in this proposition, and the greater part of the stock necessary to insure the establishment of the line has already been subscribed. An exchange is to be installed in Dougherty, and it is expected that an up-to-date service will be rendered by the new company.

SOLON, IA.—The name of the newly organized Independent telephone company at this city is the Morse & Solon Telephone Company, and the following officers have been elected: President, William Cahill; vice-president, R. Bowman; secretary, J. L. Adams; treasurer, William Andrews; general managers, A. S. Brown, H. D. Adams and John Leonard.

EMINENCE, KAN.—On account of the inability to receive satisfactory service at the hands of the Colorado (Bell) Telephone Company to Garden City, J. V. Killion, a large owner in the Mutual Company which operates lines from Eminence to Ingalls, Ravenna and Cimarron, is making arrangements to form a Farmers' Mutual Telephone Company to construct and operate a telephone system between Garden City and Eminence.

AUGUSTA, ME.—The Rio De Janeiro Telephone Company, of Augusta, has been incorporated to construct, operate and maintain telephone and telegraph systems. It has a capital stock of $1,000,000, and the following officers have been elected: President, J. E. Manter; treasurer, C. E. Eaton, Portland.

PORT HURON, MICH.—The Port Huron Citizens' Telephone Company, which has a capital stock of $200,000, divided into $25,000 common stock and $175,000 preferred, has filed articles of incorporation. The incorporators are Charles Greer, New Castle, Pa.; Leonard M. Uber, New Castle, Pa.; J. H. E. Porter, A. E. Rhodes, D. S. Ferrell, New Castle, and J. M. Ormsley, Tharm, Pa. It is the new company's intention to install a modern telephone system at Port Huron.

FOX LAKE, MINN.—The Fox Lake Rural Telephone Company, Fox Lake, has filed articles of incorporation. It has an authorized capital stock of $500, and the incorporators are A. Knudson, H. T. Ellingson and others.

WESTBURY, L. I., N. Y.—On account of the alleged poor service rendered by the New York and New Jersey Telephone Company (Bell), it was decided at a recent meeting of the business men of this place to establish a local telephone system for Westbury and Wheatley Hills. The following committee has been appointed to look out for the details of the installation of the system: John A. McKenna, Thomas J. McCord, Frank Powers, George LaSalle and S. M. Barlow.

BOONE, N. C.—The Wautauga Telephone & Telegraph Company, of Boone, has been incorporated with a capital stock of $3,000.

COLONY, OKLA.—Articles of incorporation have been filed by the Colony & Carnegie Telephone Company, of Colony. The capital stock is placed at $1,100, and the incorporators are: James Suttles, of Colony; C. S. Kern, of Kern; W. T. Matley and Frank Nelson, of Boise.

VERMILION, S. D.—An Independent telephone company has been organized by ex-Governor A. E. Lee, who was recently granted a franchise at this place. Among those associated with him in the new enterprise are: C. J. Gunderson, Jason E. Payne and E. C. Barton.

WHITEHALL, VA.—Articles of incorporation have been filed by the Whitehall Telephone Company, of Frederick county. The capital stock is placed at $5,000, and the incorporators are L. M. Bender, president, Martinsburg, W. Va.; J. E. Ebbert, secretary and treasurer; J. H. Walker, J. A. Dick, H. B. McCormick and others.

SEYMOUR, WIS.—A rural telephone company, to be known as the Culbert Valley Telephone Company, has been organized at this city, and work on the installation of a system will be commenced at once. The officers of the new company are: J. J. Culbert, president and manager; A. T. Clark, secretary and treasurer.

WARMAN, SASK., CAN.—The Warman, Sask., Telephone Company has been organized, and $3,200 of stock already subscribed. The company expects to expend in the neighborhood of $5,000 upon the installation of a telephone plant in this city.

FRANCHISES.

WARDNER, IDAHO.—A franchise at this city has been granted to the North Fork Telephone Company, and lines are to be erected along the North Fork and Idaho Northern right of way.

ROCHESTER, MINN.—It is quite probable that the franchise for which the Tri-State Telephone Company has applied at this city will be granted at an early date, the mayor, it is stated, favoring the ordinance which has been submitted.

CINCINNATI, O.—A new ordinance for a franchise at this city has been submitted by the Fitzsimmons Telephone Company, and if it is passed the company promises to give a strictly up-to-date service to its patrons.

MARION, O.—An application for a franchise at this city has been made by Grant Mouser, who, it is understood, represents Columbus interests. If it is granted, it is proposed to form a company and install a telephone system at Marion.

FINANCIAL.

GREEN FOREST, ARK.—The Farmers' Union Telephone Company, which has recently acquired the Green Forest telephone exchange, has increased its capital stock from $3,000 to $5,000.

MODOC, IND.—The capital stock of the Modoc Telephone Company has been increased from $5,000 to $10,000.

PARKERSBURG, W. VA.—The West Virginia Western Telephone Company has declared its regularly quarterly dividend of one and one-half per cent. on its preferred stock and two per cent. on its common stock.

WHEELING, W. VA.—At a recent meeting of the stockholders of the Pittsburgh & Wheeling Telephone Company an eighteen per cent. cash dividend was declared and ordered paid on the past year's business.

YARMOUTH, N. S., CAN.—The Yarmouth, N. S., Amalgamated Telephone Company, which recently declared a dividend of 5 per cent., expects to increase its capital stock to $50,000. A portion of this increase is to be expended by the company in the extension and improvement of its system.

ELECTIONS.

BRYANTS POND, ME.—The officers of the newly organized Independent telephone company at this city are Elbridge Crooker, president; H. D. Cole, secretary and treasurer.

WHEELING, WEST VA.—The following officers and directors have been elected by the Pittsburgh & Wheeling Telephone Company: John A. Howard, president; J. G. Splane, vice-president; R. C. Hall, treasurer; W. C. Handlan, secretary and assistant treasurer. Directors: J. G. Splane, Pittsburgh; J. S. Weller, Pittsburgh; R. C. Hall, Pittsburgh; J. A. Howard, W. C. Handlan, G. W. Mathews, Wheeling.

BLENHEIM, ONT., CAN.—The following officers have been elected by the Blenheim & South Kent Telephone Company, which has commenced the construction of a new line to Guilds: President, C. B. Lanford; vice-president, Neil Watson; secretary and treasurer, George Taylor.

MAYNOOTH, ONT., CAN.—The officers of the People's Telephone Company, which has a capital stock of $40,000, and which is making many improvements in its plant, are W. J. Sargeant, president; W. J. Fitzgerald, vice-president; Henry Harriett, treasurer; James Harriett, secretary and manager. The directors of the company are D. Smith, J. E. Weaver and Samuel Harriett.

MISCELLANEOUS.

FARIBAULT, MINN.—Plans have been perfected by which the transfer of the Polar Star electric light plant to the Tri-State Telephone Company has been effected, the consideration being $36,000.

TROY, O.—The Home Telephone Company, of Troy, has been reorganized, and H. M. Allen elected president.

WONEWOC, WIS.—The telephone exchange at Wonewoc has been acquired by D. H. Wofe, of Charlotte, Mich., who expects to make many improvements in the system.

BROCKVILLE, ONT., CAN.—At a recent meeting of the citizens of

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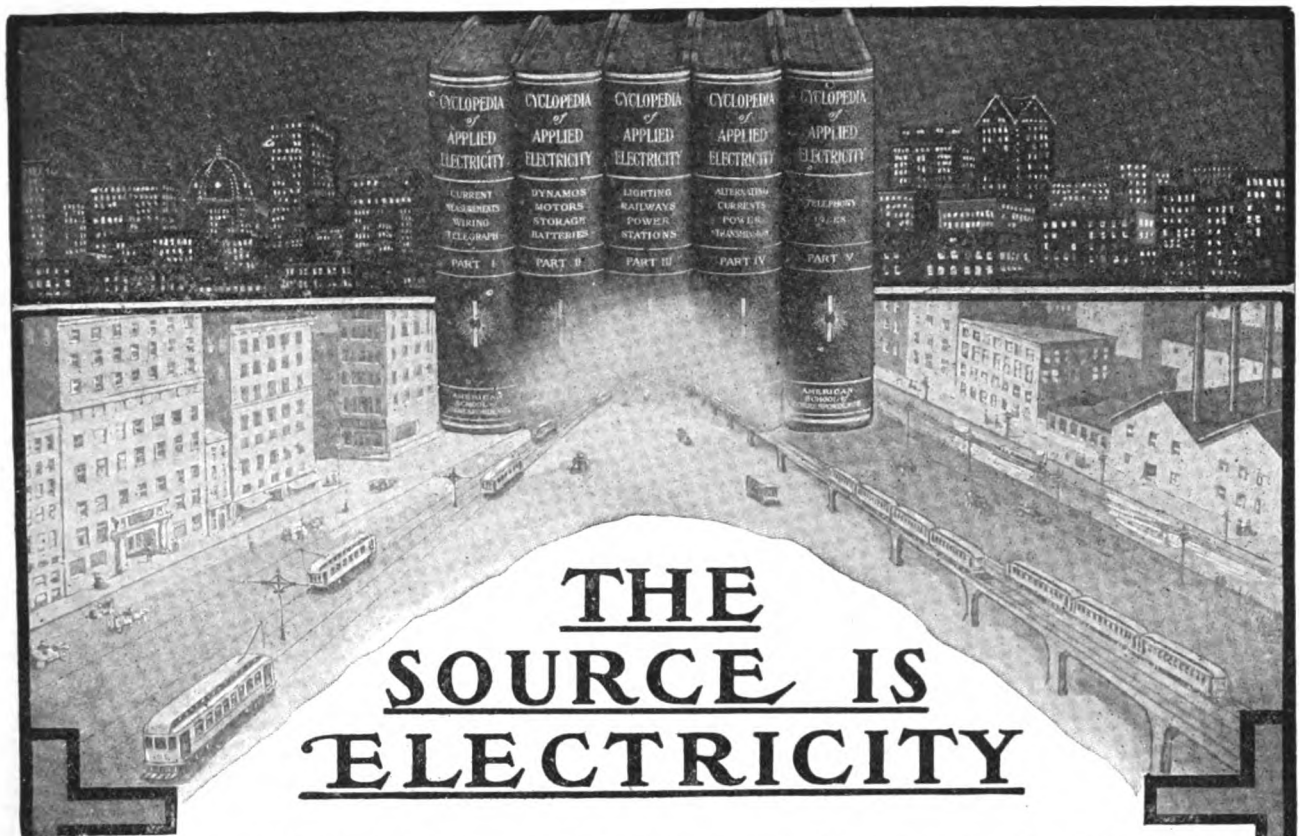

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Lines—Circuits—Distribution—Line Construction—Distributing Points—Submarine Cable Lines—Cross Talk—Pupin's Load Coils—Telephone Exchanges—Switchboards—Exchange Wiring—Operation and Maintenance—Systems—Local Calls—Trunk Calls—Toll Boards and Lines—Long Distance Switchboards—Direct and Party Lines—Code Signaling—B. W. C. System—Private Branch Exchanges—Common Battery System—Testing and Clearing Trouble—Wire Chief's Desk—Testing Circuits and Apparatus—Testing New Cables—Cutting into Service—Locating Faults—Replacing Defective Sections—Automatic Telephone—Wireless Telephony—Elements of Electricity—The Electric Current—Electrical Measurements—Electric Wiring—The Electric Telegraph—Wireless Telegraph—The Telautograph—Insulators—Electric Welding—Direct Current Dynamos—Types of Dynamos—Electric Machinery—Direct Current Motors—Electric Motors—Storage Batteries—Electric Lighting—Electric Railways—Management of Dynamo-Electric Machinery—Power Stations—A Modern Central Station Design—The Alternator—The Transformer—Switchboard and Station Appliances—Power Transmission—Mercury Vapor Converter.

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Messages of the Week

Brockville, plans were outlined by John R. Dargavel, and a resolution passed, providing for the establishment of a rural telephone service throughout the township.

PERSONAL.

H. H. BRATT, heretofore general superintendent of the Union Electric Telephone & Telegraph Company, of Rock Island, Ill., has been appointed to the newly created office of general manager.

W. D. CRAWFORD, formerly manager of the Central Union Telephone Company's exchange at Marion, O., has been transferred to Tiffin, O., as manager.

A. O. HEDBERG, formerly with the Tri-State Telephone & Telegraph Co. at Morris, Minn., has just accepted the position of Manager of the Casselton, N. D., exchange of the North Dakota Independent Telephone Co.

H. VANCE LANE on December 1st leaves the Nebraska Telephone Company to take up the duties of president of the Rocky Mountain Bell Telephone Company at Salt Lake City, Utah. He succeeds Mr. George Y. Wallace, who, although retiring from the office of president, will continue to be actively interested in the company as Chairman of the Board of Directors.

WILLIAM M. LAWRENCE has recently accepted the position of manager of the system of the Local Telephone Company in Norwalk, O. One of the first matters which he will take up is the preparation of a directory containing the names of subscribers not merely of the Local Telephone Company, but of other Independent telephone companies in nearby towns. It is expected that the directory will contain about 5,500 names.

D. F. McCLATCHEY, JR., who has for several years been in charge of the farmers' line department of the Southern Bell Telephone and Telegraph Company, with headquarters in Atlanta, Ga., has been promoted to be special agent to General Manager Brown. His headquarters will remain in Atlanta.

W. T. NAFF has been appointed manager of the East Tennessee Telephone Company's exchange at Lexington, Ky.

C. G. SCHNEIDER has recently been made Superintendent to fill the vacancy created by the promotion of Mr. H. H. Bratt to the position of General Manager of the Union Electric Telephone and Telegraph Co. at Rock Island, Ill.

WM. A. WADSWORTH, who for the past three years has been in charge of the advertising department of the Consolidated Telephone Co. of Buffalo, has resigned to enter into the advertising business.

New Construction

BENSON, ARIZ.—A telephone system has been installed by the Boquillas Land & Cattle Company from Boquillas to St. David and Fairbank.

MAGNOLIA, ARK.—A telephone line from Magnolia to Macedonia is being erected by J. W. Bradley.

SANDPOINT, IDAHO.—Many improvements and extensions in its plant are being made by the Interstate Telephone Company at this city.

HAVANA, ILL.—Among the improvements planned by the Citizens' Telephone Company is the installation of a new toll board.

SEYMOUR, IND.—The Citizens' Telephone Company, which is a local corporation operating an exchange in the rural district, and which was recently granted a twenty-year franchise at Seymour, expects to commence the installation of an exchange in that city at an early date.

AUDUBON, IA.—The lines of the Audubon County Telephone Company between Audubon and Exira have been rebuilt, and the company is planning other improvements at Audubon.

HAMPTON, IA.—The Central Iowa Telephone Co., whose headquarters is located in Iowa Falls, contemplates the entire rebuilding of its plant at Hampton.

HUMBOLDT, IA.—Owing to its rapidly increasing business, the Rural Union Telephone Company has decided to install a new switchboard at this city. Many other improvements in its system are contemplated, and it is expected that a strictly up-to-date plant in all particulars will be in operation in the near future.

WASHINGTON, IA.—The Washington Telephone Company is rebuilding its system at this city, and expects, when the work is finished, to have a plant which will be up-to-date in every particular.

CLAY CENTER, KAN.—Among the improvements planned by the Clay Center Telephone Company are the installation of a modern new multiple switchboard, a new toll board, new office equipment, the cabling of the business part of the city, and the changing of the entire plant to a metallic system.

MADISON, ME.—The exchanges of the Maine Telephone Company at Madison and Skowhegan have been entirely rebuilt.

PEMBROKE, ME.—A metallic circuit line between Pembroke and Dennyville, which is to form part of a trunk line between the latter town and Calais, is being constructed by the Forest Telephone Company.

FRAZEE, MINN.—A telephone line from Frazee, by way of the Otter Tail river, to Grand Park, is being built by the Nichols-Chisholm Lumber Co.

MANKATO, MINN.—The Mankato Citizens' Telephone Company contemplates the erection of a new line between Mankato and Hebron.

LAMAR, MO.—Among the improvements being planned by the Golden City Telephone Company, of Golden City, is the construction of a line from Lamar to Ash Grove, one from Golden City to Carthage, and another to Jasper. It also expects to utilize several carloads of poles in the betterment of its system.

REEDS, MO.—The White Oak Independent Telephone Company is at work on the construction of a line from Reeds to Avilla.

FAIRMONT, NEB.—To take care of its greatly increased business the Independent Telephone Company is considering the advisability of installing a new switchboard.

THERESA, N. Y.—Among the extensions in its system being made by the Theresa Telephone Company is a line from this city to Ox Bow. Other improvements are also being discussed.

WILSON, N. C.—About fifty thousand dollars has been expended by the Carolina Telegraph & Telephone Company in the improvement of its system.

BELLEFONTAINE, O.—Improvements are being made by the United Telephone Company at this city which will enable it to serve about double the number of rural subscribers that it does at present.

YOUNGSTOWN, O.—It is the intention of the Youngstown Telephone Company to erect a line from Ellsworth to Canfield, and to otherwise enlarge its plant.

ALLENTOWN, PA.—The Consolidated Telephone Company of this city has been extending its lines throughout Lynn township.

BONESTEEL, S. D.—The manager of the Gregory County Inter-State Telephone Company, which has its headquarters in Bonesteel, states that his company is planning for some extensive improvements in the new town of Dallas, which include the establishment of a first-class exchange.

DALLAS, S. D.—It is the intention of the Gregory County Interstate Telephone Company to install a local telephone exchange at this city. A sufficient number of subscribers have been obtained to justify the company in making this move, and a complete metallic circuit, which will give patrons first class local and long distance connections, is to be put in at once.

VIENNA, S. D.—Arrangements are being made for the construction of an Independent telephone line southwest of Vienna, which is to be connected with the Dakota Central Company's lines at that place.

ROCKY MOUNT, VA.—The Franklin County Telephone Company, by means of its recently constructed lines, is able to communicate with Gogginsville, Wertz, Alean and Taylors Store, in fact, connections have practically been established with the entire northeastern part of the county. Other extensions and improvements are contemplated in the near future.

ALLENTON, WIS.—Many improvements and extension in its plant are being made by the Allenton Telephone Company.

BARRON, WIS.—The lines of the Hillsdale & Western Telephone Company are being extended in this city.

CLINTON, WIS.—The Clinton Telephone Company contemplates the installation of a new switchboard and a number of other improvements.

DELTON, WIS.—A telephone line between Delton and Kilbourn is being erected by Reynolds and Lambert.

HONEY CREEK, WIS.—Among the extensions planned by the Eagle Telephone Company is the erection of a new line to the German settlement west of Honey Creek.

INGRAM, WIS.—A telephone exchange is to be established at this city by the Chippewa Valley Telephone Company and a first class service is promised.

KAUKAUNA, WIS.—The Fox River Valley Telephone Company is planning for the construction of an exchange at this city.

CLARESHOLM, ALTA., CAN.—The Prairie Farmers' Telephone Company is extending its lines into the Star districts.

AMARANTH STATION, ONT., CAN.—The Amaranth Telephone Cooperative Association, of which Stewart Tate is secretary, contemplates the extension of its lines.

UNDERGROUND.

SAN FRANCISCO, CAL.—Application has been made by the Home Telephone Company for permission to lay additional conduits in this city.

DECATUR, ILL.—Wires are being placed underground in a considerable portion of Decatur by the Automatic Telephone Company.

LOCKPORT, ILL.—Considerable conduit work is being done by the Northwestern Telephone Company in this city.

HAMPTON, IA.—The Central Iowa Telephone Co. expects to install all of its wires underground in the business portion of Hampton, and it is quite probable that a similar course will be followed at Iowa Falls, its headquarters, Eagle Grove, and other points where it operates.

KALAMAZOO, MICH.—About 25,000 feet of conduit are to be laid by the Kalamazoo Home Telephone Company in this city.

WINNIPEG, MAN., CAN.—Work on the underground conduit system of the Government is progressing very rapidly. Already 400,000 feet have been laid, and it is the intention to lay half as much more.

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VOLUME XVI. SATURDAY, DECEMBER 7, 1907. NUMBER 23.

Rules for Operating Room Employees

A Complete Set of Instructions and Rules for the Government of Local Operating Room Employees.

COMPILED BY KENDALL WEISIGER.

Illustrations from special photographs by John Putnam.

FURTHER instructions which may properly come in the same classification with and complete those included in section *"d,"* published at the close of last week's section of this article, are as follows:

Where office designation and party line letters are used, the exchange name and letter designating party to be rung must be repeated, as well as the number called for.

¶In cities having more than one central office the offices are generally designated by names. The name becomes a part of the subscriber's number and it must be repeated for check by the operator as forming a part of the number called. The same thing is true of letters used as suffixes to designate party line stations.

On calls for code ringing lines, insert the word *"Ring"* between the line number and ring number.

In repeating numbers for check, or in passing numbers over call circuits, each figure should be repeated separately. Where the same figure occurs twice in succession, the word *"Double"* may be used to advantage. Examples, West 456-J, West, four, five, six, J; East 65-12, East, six, five, ring one, two; North 9000, North, nine oh, double oh; South 4009, South, four, double oh, nine. In districts with only one office the office designation is not used. On calls for numbers containing the numeral two, three, five or nine, operators should be especially careful to avoid the possibility of errors, as the sounds of these numerals are easily confused.

"Answering the line signal."

¶Care should be taken to see that operators follow the adopted plan of repeating numbers, regardless of the way in which the subscriber calls the number. Many subscribers believe that the operator repeats the number in a different way just to be perverse.

¶Opinion is also divided as to the use of the words "double" and "oh." The word "double" possesses some merit, and it is used by a number of operating companies. The word "oh" is used as a substitute for "nought," but its usefulness depends on the section of the country in which the exchange is located. In the South, where the "r" sound is not brought out distinctly "oh" is frequently confused with "four."

¶The importance of careful enunciation cannot be overestimated, particularly in connection with trunk operating. Trunk operators should of necessity be well trained on this point. One poor trunk operator can demoralize an entire distant central office which is depending on her for trunk connections. In order to prevent mistakes "three" is pronounced "thr-r-r-ee" to distinguish it from "two." "Five" is pronounced with stress on the *v* sound to distinguish it from "nine," with which it is so often confused.

(*e.*) In districts where there are two or more offices, should the subscriber fail to give the exchange designation, the operator must not take it for granted that the call is for a subscriber in her own exchange, but she must, in every case, ask the subscriber, *"Which office, please?"*

COMPLETING A LOCAL CONNECTION.

NOTE.—In order to simplify these instructions, the example will be used throughout of a subscriber, Main 123, calling either Main 456 or North 789.

If the call is for a line that appears within reach of the "A" operator, it should be completed as follows:

(*a.*) While repeating the number for check, take the front plug of the pair selected and test the multiple jack or jacks of the called subscriber by striking the tip of the plug against the rim of the jack.

¶Subscriber's switchboards are divided into two classes, arbitrarily called "A" and "B" switchboards. The operators operating at these switchboards are known as "A" operators and "B" operators respectively. An "A" operator is one who answers subscribers' line signals. A "B" operator is one who puts up trunk connections. The operation referred to in the second preceding

EDITOR'S NOTE.—This is an actual set of working instructions for a traffic department. Supplementary notes inserted for the information of telephone men who are not operating experts, or to explain doubtful points, but not properly included in the actual working copy, are contained in paragraphs preceded by the sign (¶). Continued from the issues of November 16, 23, 30.

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paragraph is known as getting the "busy test" and is, of course, not necessary in switchboards not equipped with multiple jacks.

(*b.*) If a sharp clicking sound or a high pitched humming sound is heard, say to the calling subscriber, "*Main four five six busy.*" If the underlining of the jack shows it to be a party line, say to the calling subscriber, "*Main four five six line busy.*"

¶The sharp clicking sound is the "straight" busy test, the high pitched humming sound, in offices equipped with "tone test," denotes that the line is busy and being held for long distance. This sound has no especial meaning to any operator except the "B" operator handling toll trunks, other than that it is treated the same as the straight busy test. To the "B" operator, handling toll or long distance trunks, it means that the line is being held for her, so she pays no attention to the tone and plugs into the jack. This high pitched humming noise is known as the tone test and is used in most large offices, especially where the toll business is handled on what is called the no delay basis, i. e., where the business is of such a nature that it can be handled with such dispatch that the calling subscriber's line can be held while the distant party is being connected.

(*c.*) If a low pitched humming sound is heard in addition to the sharp clicking sound, say to the calling subscriber, "*Main four five six is out of order,*" or "*Main four five six line out of order,*" in case of a party line.

¶There is a question as to whether the benefit to be derived from having the called number repeated in this case will be sufficient to merit the practice. Some companies simply report "busy," others "line busy" to cover party lines; it is doubtful if the public will appreciate the use of the word "line" in this connection. In repeating the number before giving the busy report it assures the calling party that the operator has received the number correctly and that the line called for and not some other number is busy.

(*d.*) If the jack does not test busy or out of order, insert the plug and close the listening key.

(*To be Continued.*)

How to Make and Install a Repeating Coil

BY HARVEY FLINT.

IN an exchange where the local lines are grounded and toll or trunk lines are metallic, it is often the case that while both the local and toll lines are quiet enough by themselves, as soon as a short grounded line is connected to a long metallic one the combination becomes so noisy as to make it impossible to carry on a conversation over it with any degree of satisfaction. This is especially true if there is an arc light circuit in town. In such an event it is quite possible that even some of the local metallic circuits, if the insulation is low or they run very close to the arc light circuit will begin to hum in a very lively fashion as soon as connected to toll lines.

To meet such a condition as this it has long been known that the proper thing to do is to install a repeating coil in a switchboard cord circuit, so that the local line need not have any metallic connection to the toll line. This will usually cut out the greater part of the noise. Although good coils for this purpose can be bought from a number of manufacturers the writer believes that there are still a considerable number of telephone men who would like to make such a coil for themselves, and put it in their own switchboards. This article will tell some of the points which must be looked out for in selecting the material for such a coil, and show how to make it easily and cheaply in such a way that a man in almost any town can get everything that is put into it at small trouble and expense, and fit it together without the use of special machinery.

Types of coils.

In the first place, a man who is going to build a repeating coil has to consider that repeating coils can be roughly divided into two classes. Those in one group are designed to repeat both ringing and talking currents. Coils of this type can be placed directly between two line circuits, and will repeat the "rings" from one line to the other as well as the conversation. They are known as "Ring-through" coils.

Coils of the other type are designed to repeat voice currents only. These coils are usually wired into the cord circuit of the switchboard in such a manner that it is not necessary to ring through them, and are known as "Talk-through" coils.

On making a close examination of successful commercial coils in these respective classes, and studying the discoveries which have been made in the process of their development one finds that the principal variations in construction which will be noticed are: More or less iron in core; magnetic circuit open or closed through shell; winding of high or low resistance and of heavy or fine wire.

The amount of iron in the core.

The telephone repeating coil can be considered as a form of induction coil. It has two windings upon an iron core, both windings usually of the same resistance and number of turns, so that there is no "step down" nor "step up" effect, such as is usually present in other types of transformers or induction coils. It depends for its action upon the fact that when currents, alternating in character, such as voice or ringing currents, are passed through one of the windings, which may be called the primary, a current is induced in the other or secondary winding, which is identical in character with that in the primary Taking up this action in detail, it is found that when a current is passed through the primary the core is magnetized. When this current decreases, as is the case with all alternating currents which change or reverse their direction at every alternation, the energy which is stored up in the core in the form of magnetism acts upon the windings, and induces a current in the secondary or other winding from the one through which the exciting current is passing, similar in all respects, except a slight loss in strength and distortion of wave form, to the current which produced the magnetism. Some appreciable time is necessary, however, for an iron core to be magnetized after current is turned on, and for it to give up its magnetism after the current is turned off, or when the current is varied in strength the changes in the strength of the corresponding magnetism do not keep exactly in time with the changes in current. The greater the amount of iron, the greater difference does one find in this effect. For

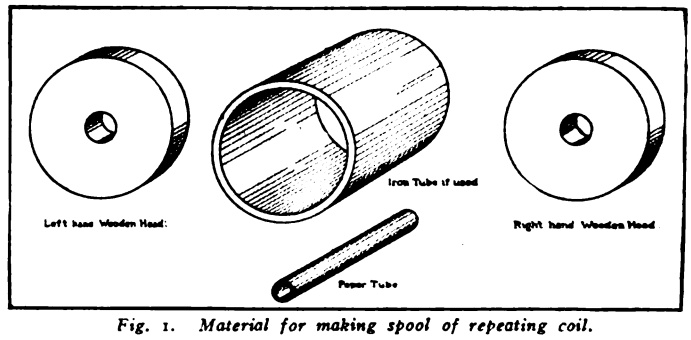

Fig. 1. Material for making spool of repeating coil.

this reason the amount of iron to be put into a core is determined by the class of current it is necessary to repeat. If the coil is of the "Ring-through" type, it must repeat currents having a rate of change of about one thousand times a minute and considerable *quantity*. A large amount of iron is necessary to transform this energy with as little loss as possible; that is to say, a large heavy core is necessary when a ringing current of a slow rate of alternations is to be repeated, so that a considerable portion of energy will be absorbed by the core. On

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the other hand, where small weak currents, such as voice currents, are passed through a coil with too large a core they are muffled and distorted by the slow action of so much iron. The "Ring-through" type of coil is therefore not adapted to secure the very best results in repeating voice currents only, as without the large core the coil will not repeat ringing currents, and with the large core it chokes or muffles the voice currents, which have a high rate of change, about 90,000 times a minute, and are of exceedingly small quantity, the large iron core being too slow to respond magnetically to such rapid changes.

Open or closed magnetic circuit through shell.

In "Ring-through" coils, the outside shell is connected to the ends of the core, so that a complete magnetic circuit is formed. This adds to the amount of iron subject to the influence of the windings, and the shell also prevents leakage from one coil to another when they are mounted side by side, thus making cross-talk impossible.

In the "Talk-through" type the presence of so much iron is undesirable. The core should therefore be separated from the shell, which should nevertheless be retained to prevent leakage likely to produce cross-talk.

Windings.

The windings of a repeating coil are determined by the conditions under which it is to be used. For instance, if the coil is to be used for common battery work, the wire must be large enough to carry the current without heating. The ohmic resistance is of comparatively little importance, as it follows that if a sufficient number of *turns* are put on the coil to properly affect the core, and the wire is of the proper size, the ohmic resistance alone is not a factor, except where the coil is to be bridged on a line, in which case the resistance is made sufficient to prevent any short circuiting effect the coil would have on the telephone bells on the line.

As voice currents are of minute quantity, wire of very small diameter can be used in coils designed to repeat voice currents only.

The coil to be described in this article belongs to the "Talk-through" class, and, owing to its small size and high efficiency, is particularly recommended for use in the cord circuits of a switchboard. The exact dimensions as given need not be adhered to, in fact, an old induction coil spool and the wire from a discarded ringer or generator, will, if properly assembled, make an excellent coil.

Constructing a coil.

To make the spool, take two pieces of wood about ¼" thick, and of the proper size to fit inside a piece of iron pipe about 2" outside diameter. Bore a hole in the centre of these large

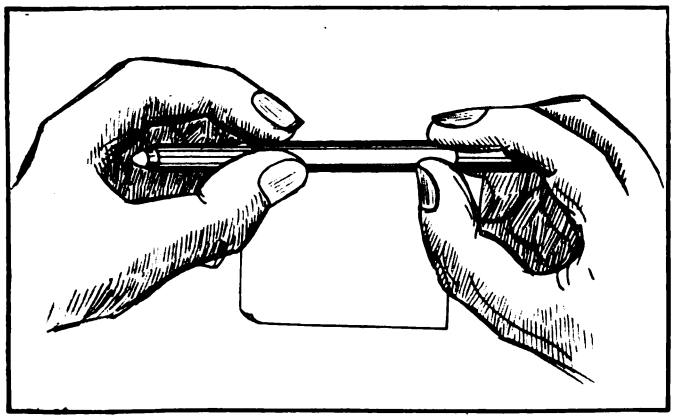

Fig. 2. Method of making paper tube upon which primary is to be wound.

enough to slip on a tube made by rolling two or three layers of thin paper on a lead pencil. After making this tube, the separate layers in which should be glued together so that the tube will be quite stiff, glue the heads on the tube with a 1 1-16" space between heads. These different parts are shown in Fig. 1.

One head should be drilled for terminals, which can be made from brads or pieces of copper wire, and holes should be made for the wires. Lay this out as shown by Fig. 3. Countersink the wire holes on the back, as shown in the cross section.

Get a stick which will fit into the hole in paper tube. Split one end of this, and fasten the core on the stick. When in place,

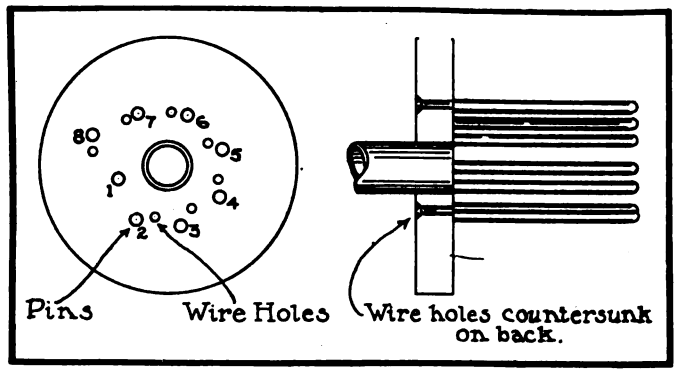

Fig. 3. Layout of terminals of head of coil, and cross-section when finished.

drive a wedge in the split end of the stick, and the coil will be held firmly. The clear end of the stick can be put in a lathe to hold the core while it is being wound, or the coil can be held in the hand.

(To be concluded.)

DEATH OF MORRIS F. TYLER.

MORRIS F. TYLER, president of the Southern New England Telephone Company, died at his home in New Haven, Conn., as the result of a stroke of apoplexy, on December 4th, 1907. Mr. Tyler was a graduate of Yale, 1870; Yale Law School, 1873; and had been treasurer of Yale University.

SUPPLEMENT TO OFFICIAL BULLETIN NO. 6 OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION.

WHILE the present financial stringency may make it difficult for a time to secure money needed for extensions and development of new territory, it should be remembered that the Independent telephone movement had its beginning at the most acute period of one of the worst panics this country ever experienced.

Starting under the most inauspicious circumstances, the Independent companies have grown from nothing until they operate over 3,000,000 instruments, more than ten times the number in use at the close of the first seventeen years of the old company's existence. In the State of Ohio alone the Independent companies operate as many telephones as there were in the entire United States, when they entered the field, with their securities distributed among thirty thousand stockholders. Conditions similar to those in Ohio prevail in a number of states.

To the Independent companies belong the credit for the extension of the telephone to the rural districts. It is principally to their efforts, too, that the country owes its long distance development. For, while their competitor may have longer through lines, the Independents are indisputably in the lead with short haul lines, and it is over these lines that more than 90 per cent. of the long distance business of the country is transacted.

The Independent companies have built up a business that is the marvel of this progressive age. The first few years of its existence coming under the most unfavorable financial conditions, to-day they are successfully operating competing systems in all the important cities of the country, with the exception of five or six; strange as it may seem, the introduction of a competing company, instead of driving its predecessor from the field has, in most cases, been the signal for greater development, the Independent company keeping steadily abreast of such development and often surpassing it.

In some cases the Independent movement had its origin in a just sentiment against monopoly and commercial oppression, but it is to-day conducted along purely commercial lines and there is no good reason for a conflict between the two systems beyond ordinary competition for business, with a constantly growing

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demand for telephone service, which both systems, work as they may, have never been able to supply.

The Independent companies were handicapped at the start by lack of skilled men and efficient manufacturing facilities, but this condition has changed. To-day their forces include the best engineers and most successful business managers, and there are more than fifteen large exclusive manufacturing concerns and probably fifty smaller ones turning out equipment for Independent companies that is equal and in some cases superior to that used by their competitor. Recently the Western Electric Company, the principal manufacturing concern for the Independents' competitor, entered the open market and is now offering its product to all who may care to purchase. While the Independents have neither the need nor inclination to buy such equipment, this latest move may be regarded as a recognition of the strength and stability of the Independent telephone movement.

With such a demand for the commodity furnished by Independent telephone companies, insuring their permanency in the commercial world, and in view of the fact that these companies have developed and prospered in spite of every outward condition, and are now demonstrating that the earnings of telephone companies are not adversely affected during periods of business depression, it must be apparent to the careful investigator that the securities of Independent telephone companies offer a safe form of investment even in the dullest times.

Independent operators everywhere should present the two points to the notice of their bankers, bond and stockholders and prospective investors, for the purpose of maintaining and strengthening the confidence in Independent telephone securities which they deserve, viz., THAT THE INDEPENDENT TELEPHONE MOVEMENT WAS STARTED IN THE PANIC OF 1893; AND THAT THE OLD COMPANY NOW OFFERS TO SELL APPARATUS TO THE INDEPENDENTS, FOR THE FIRST TIME IN THE HISTORY OF THE BUSINESS.

THEODORE GARY, President.
CHARLES WEST, Sec'y. By J. A. HARNEY, Ass't Sec'y.

A Talk on Collections

BY RAMON D. BOYD.

MUCH as has been written upon the work of the collection departments of telephone companies there are many more valuable points, brought out by experiences of various companies, that do not go on record, and therefore do not benefit telephone people generally. In experimenting or in seeking the cause of some irregularity a man often happens upon something beneficial to others in the same line of work, but which he does not consider of sufficient importance to describe in a special article for their benefit. When this same man is searching for information on an unsolved problem, however, he begins to appreciate that all the good pointers on collections which he discovers are worth publishing. Anything that helps telephone men, anywhere, to make a better financial showing helps the business everywhere, by creating among investors that greater confidence which is so necessary.

Routine handling of collections is a matter demanding prompt and regular calls, and this is such a fundamental point that each man's experience furnishes all the emphasis it needs. The slow account, however, is but another name for a collection of baffling problems, for many of which hardly anyone is ready to boast that he has discovered the correct solution.

Handling slow accounts.

The grocer sells on credit to a customer who, after paying promptly for a time, falls in arrears. When this happens two questions confront the dealer: "shall I refuse this customer further credit," he says, "and probably lose the amount he now owes me, or shall I carry him a while longer in the hope that he will pay up later?" Few telephone companies have missed a similar experience, and none will deny that a bad telephone account is the most difficult of all accounts to collect. The cause of this is that the delinquent reasons that the service for which he owes "did not cost the company anything anyway," and the bill for telephone service is therefore about the last one paid. Recent court decisions affecting this department have held that a man, even though he may owe for previous service, by paying cash can demand service without paying the old account. This position taken by the courts generally would be beneficial to the telephone business where there is no opposition or where the opposition would agree, and live up to the agreement, to demand one, two or three months' rental in advance without discriminating.

Amount of loss from bad accounts.

If it were possible to show the actual loss during the present year, for the entire country due to bad accounts alone it would no doubt startle telephone managers into some definite step toward stopping this drainage. Any general estimate one would hazard would either be too large from over-anxiety to impress the necessity for action, or too small from an endeavor to be conservative. Figures from one or two companies are useless as a criterion for the determination of the average percentage of loss; however, a slight idea of what often happens can be derived from figures given out from the headquarters of an eighty-five exchange company, where it was stated that the exchange having the largest percentage of collection for the last six months of 1906 showed 83 1-3 per cent. It was assumed from past observations that of the remaining 16 2-3% shown on the uncollected report during this period of special effort in keeping the uncollected down to the smallest possible figure, only 5 1-3% was collectable, leaving 11 1-3%. To this loss must be added the cost of collecting the 5 1-3% and attempting to collect the 11 1-3% which was figured at 1-3%, a total of 11 2-3% of the revenue for six months as the total actual loss.

Necessity for general action on broad lines for benefit of telephone business.

One cannot even conjecture what the relationship between the opposing telephone companies will be in the future, but it is safe to assume that for self-protection they will get together on a cash in advance basis or work separately toward that end. One of the many enemies to a small uncollected account is the inclination of companies controlling several exchanges to secure influential citizens or business men for local representatives. As men in neither of these classes will jeopardize their own business, or cause unpleasant feeling among their friends by enforcing the payment of telephone bills, the unbusinesslike friendship existing between them and the public is largely responsible for many of the bad accounts of telephone companies.

The "rebate for time out of service" evil.

In many companies trouble slip records are not carried far enough after they have been O K'd, and they thereby fall short of the entire purpose for which they are intended. If rebates must be given on account of an inadequate maintenance force, after a trouble slip has been completed and a record made on a sheet provided for that purpose of the number of days a station has been out of service during the month, it should be carried to the accounting department where credit is given to the subscriber for the time he has been without service, whether he demands it or not. A common occurrence is for the collector to go to Mr. Brown with the last month's rental bill, and listen for half an hour to the trouble Mr. Brown had on account of his telephone not working at all or poorly. "Why," the man will say,

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"that telephone was out of order at least two weeks last month"—but he will have no data written to back up his statement. This assertion is made, and the collector with no record of the station's trouble during that month can do nothing but return to his manager and report. The manager inquires of the operating department and receives the usual reply "Guess his 'phone was out of order two or three days, but not over that" and the final result is that the statement of Mr. Brown is taken as correct and a notation is made on the uncollected report "out of order for two weeks." Everyone knows that this is often true, and knows too that it is not business and is almost wholly due to failure to carry the correct trouble slips into the accounting department where Mr. Brown would have received credit for the exact time his telephone was out of order, or as near the exact time as is possible under the present system. By doing this one avoids wrangles with subscribers who are always looking for some excuse for not paying their telephone bills or for getting a rebate. Such a plan will impress them with the business-like methods of the company, and save the additional time and expense of having the collector call upon the subscriber the second or third time. Only two excuses ought to be accepted from a collector who fails to collect a bill, namely: *"Out of town"* or *"Did not have the money."* It is of course impossible to keep an accurate record of each day a station is out of order, but it is a decided help in this to give a subscriber to understand that a rebate will be allowed only for the time from the day he reports his telephone out of order until it is repaired, and to keep in touch with the work of inspectors.

Discontinuing service.

The writer is a patron of a natural gas company—the last day for paying the current month's rent is the 20th day. It has been understood from the beginning that unless the amount due reached the gas company's office by that date the gas would be turned off the following morning. Investigation was made the next day after learning this, to see if the writer's credit was below the average, and he found that each patron had received the same notice, and a further impression later was made by learning of the company's making good that statement in several cases. The patron wants the gas, and so is very careful to see that this bill is paid before that date if possible. There are other bills that generally could be, but are not paid promptly—the reason is plain, and it is our telephone companies who are to blame for large uncollected accounts, not the public.

Unprofitable contracts.

Here and there one learns of telephone companies securing large numbers of contracts, but it is unusual to see a report six months later of how much money was lost on bad accounts of these new subscribers, often gained in haste by over-ambitious solicitors. There was a time when it was necessary in many cases to give a period of free service in order to educate the public up to the general use of the telephone—that time has passed and the company which requires one, two, or three months' rental in advance at the time the telephone is installed, with the understanding that such advance payment is to continue until such time as the instrument is removed, will show larger returns to the stockholders for the amount of money invested and be in a far more healthy physical condition than the neighboring company which has made a much larger gain in numbers without particular attention to the class of patrons. Every new subscriber must be considered a part of the foundation upon which the company's enterprise rests, therefore every precaution should be exercised as to the manner in which they are secured, and in all dealings with them through the collection department.

PRACTICAL DISCUSSIONS THE PRINCIPAL FEATURE OF CALIFORNIA ASSOCIATION MEETING.

THE California Independent Telephone Association held its regular quarterly meeting on Nov. 23d, in Los Angeles. Members met at the office of the Los Angeles Home Tel. & Tel. Company, were taken in charge by several officials of the company, and shown through the new general office building. The building was completed about July 1st, and is considered one of the most complete and up-to-date telephone buildings in the United States. Mr. Leo Keller, chief engineer of the Los Angeles Home Tel. & Tel. Co., acted as guide, and gave a very good demonstration of the working of the latest style of automatic equipment.

At the regular business meeting a report of the treasurer showed the association to be in good financial condition. The dues to the National Association were ordered paid, and a committee appointed to arrange for a representative at the Chicago convention. No applications for membership to the association were received. It appears that every Independent company in Southern California is already a member.

The question box was the occasion for some lively discussion. The items of directory advertising, extension bells and desk telephones were the most popular. Practically every one present had something of interest to say, but boiling it all down the following seemed to be the opinions of the majority:

Independent telephone companies should use all advertising matter possible to be secured in their directories.

In securing advertisements the company should act as a censor and see that the advertisements do not draw attention away from the directory itself.

The best plan is to charge by the month. It is not always possible to set an exact date for the publishing of a book and when the issue "runs over" one or two months it is possible to collect the advertising bills for those months. Actual experience proves this to be true.

A great many different ideas were brought forth regarding extension bells. Some charge a stated monthly rental. Others sell the bell outright. In some cases the bell is given free with the extension telephone. A popular idea was that extensions should bring one-half as much revenue as the main telephone, excepting only when a subscriber has an extension in the same room as the main telephone and uses the extension for his own personal business. A charge of a dollar for extra name in the directory was well thought of, as was fifty cents extra for a desk telephone both in business houses and residences. Additional maintenance cost is the reason for the extra charge for desk telephones.

Mr. D. S. Parker of Pomona was one of the lights of the meeting. He stated that the greatest trouble with his directory is its popularity. It is a fine specimen. He complained that many were being stolen. He has over 75 per cent. of the merchants as advertisers. The book is really an up-to-date city directory. In Pomona the "Bell" is down and out, so much so that when a raise in Independent rates came in October not a subscriber was lost. Each and every member reported himself as more than holding his own in competition.

The meeting closed with everyone highly pleased with the results. A banquet was served at the Cafe Bristol in the evening. Speeches were given by J. E. Mathews of the Covina *Argus*, W. G. Stearns of Los Angeles and J. O. Houser of Covina.

The following members were in attendance: Arthur Wright, president, Los Angeles; A. Wardman, secretary, Whittier; W. L. Frew, treasurer, Compton; H. C. Goldrick, C. F. Hortung, Parker Reed, W. G. Stearns, F. W. Wright, L. W. Drake, A. C. Schnetzler, Fred. E. Smith, C. H. Temple, Los Angeles; N. Yenrick, San Diego; L. C. Torrance, Santa Monica; Carl Larlue, Pomona; J. D. Reed, Covina; C. J. Wendell, C. G. Pyle, Los Angeles; E. J. Anderson, Redlands; E. A. Carter, A. B. Cass, Los Angeles; Edgar O. Fawcett, Alhambra; J. O. Houser, Covina; L. Keller, E. P. Morphy, G. D. Feldner, Los Angeles; A. L. Orton, Pasadena; F. W. Rea, H. C. Brokaw, Los Angeles; D. S. Parker, Pomona; H. L. Brubaker, Los Angeles.

CARTRIDGE SHELLS FOR TEST BOARD TERMINALS ON A RURAL SYSTEM.

C. C. DUNHAM, agent for the Foxcroft Farmers' Telephone Company, Dover, Me., says *New England Telephone Topics*, has arranged an interesting switchboard for testing his lines. He secured a hardwood board, and through

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it bored two rows of holes. Into each hole he forced from the back an empty brass cartridge shell, .44 calibre. To the backs of these shells he secured taps from each of his lines, brought into the house for this purpose. Two long cords from an ordinary telephone instrument placed beside the board are tipped with cartridges of .38-.55 calibre, the tips of which are a tight fit for the mouth of the .44 shells attached to the lines. Not content with telling this much of the story, Mr. Dunham has put forth the claim that he can place a primer in each of the .44 shells, and if there happens to be a thunder storm the lightning will explode the primer and blow out the .38-.55, thus disconnecting the side instrument. He wants to know who can beat this.

NATIONAL GRANGE FAVORS TELEPHONE COMPETITION.

A RESOLUTION introduced into the National Grange, Hartford, Conn., Nov. 19th, 1907, by W. F. Hill of Pennsylvania, referred to the Committee on Resolutions and by them reported favorably on Nov. 21st, and unanimously passed, is as follows:

The National Grange having, in the past, opposed monopolies of any and every kind and a telephone monopoly in particular, your committee desires to call your attention and it is with pleasure we note the immense increase in the number of telephones in use among the farming communities and especially where competition is most active.

We find the service is better, rates lower and the number of telephones greater under competition than under monopoly and therefore recommend the passage of the following resolutions:

WHEREAS, The telephone has become a public convenience and necessity, which should be installed in the home of every farmer, we wish to go on record as favoring telephone competition as the only means whereby we can receive the best telephone service at the lowest rates.

We condemn any law that fosters a monopoly in the telephone business as against the best interest of the members of the Grange and the people generally, and call upon the members of the different organized bodies, members of the Legislature in the different States, members of the House of Representatives and Senate in Congress convened, and the President of the United States, to use their best endeavors to allow free competition and permit the people of this nation to buy telephone service when and where they please.

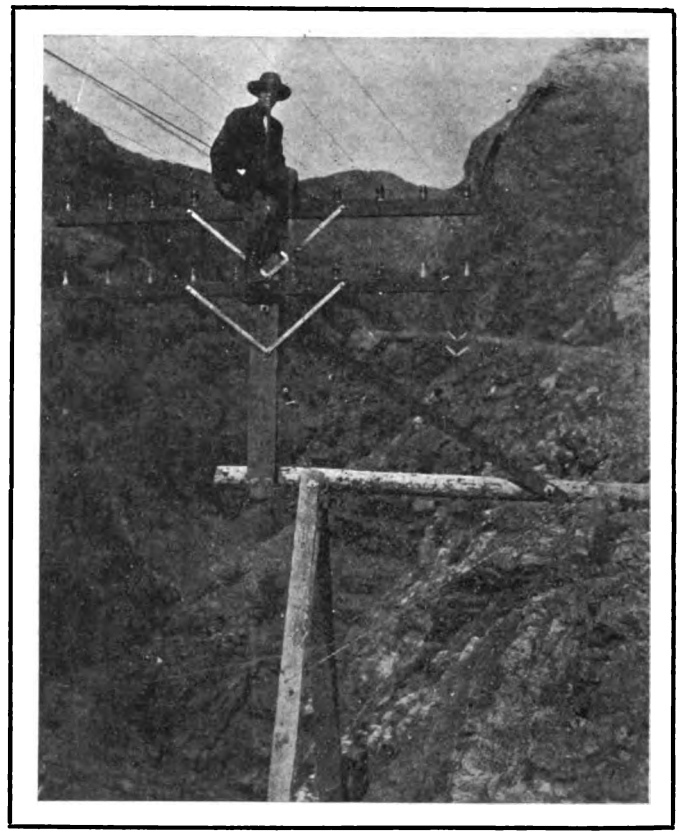
We condemn any law or method whereby the people must pay tribute to a monopoly for a necessity of life and are opposed to the United States Government making exclusive contracts with any telephone company, and call upon each and every member of the Grange of the different States to use their best efforts to see that laws are enacted and men elected to public office that will give us active competition in the telephone business.

Signed { A. O. JONES, of Indiana;
G. W. BAIRD, of Minnesota;
T. C. ATKESON, of West Virginia;
Committee on Resolutions.

This puts the Grange squarely on record, and on account of its wide influence, and the extent to which its members, owing to the strength of their feeling as individuals will back up the official statement, is perhaps the most important expression on this subject which has ever been made public.

U. S. FOREST RESERVE TO BUILD ADDITIONAL TELEPHONE LINES IN IDAHO.

ANNOUNCEMENT has been made that F. L. Fromme, acting supervisor of the Priest river national forest reserve in Idaho, northeast of Spokane, Wash., has been authorized to install twenty-five miles of telephone lines between Newport and Priest Lake. The work of constructing the telephone lines will begin early in December, and should be in operation next summer. The system will assist in opening many square miles of country now locked up and inaccessible to settlers and users of the forest, and will facilitate the work of protecting many valuable stands of timber from destructive forest fires. An appropriation has been made for six miles of telephone lines in the Bear river national forest in Idaho, to connect Strawberry Springs with the Preston Hatcher toll line at Mint Creek.



Lineman Perched Eight Hundred Feet Above Bottom of Cañon, South of Ouray, Colorado. Pole is Set Out on Trestle to Avoid Interference With Passing Teams. Photograph Reproduced by Courtesy of The Transmitter, Published by Colorado Telephone Company.

VIRGINIA CONVENTION BRINGS OUT MANY NEW INDEPENDENT COMPANIES.

THE annual meeting of the Virginia Independent Telephone Association was held at Norfolk, Va., on Nov. 26th. The meeting was marked by the utmost enthusiasm and good feeling among the members in attendance. After the opening address by the president, reports were received from various districts of the State, which showed that Independent telephony has progressed along aggressive yet conservative lines, the number of Independent companies in the State having largely increased within the present year, and a general improvement being marked in the character of service and methods of construction. It has been one of the main purposes of the association to promote the extension of toll lines and uniformity in construction.

The election of officers for the ensuing year resulted as follows: President, W. N. McAnge of Suffolk; first vice-president, F. F. Marbury of Alexandria; second vice-president, Jonathan Woodhouse of Norfolk; secretary and treasurer, B. L. Fisher of Rocky Mount; executive committee, W. N. McAnge, Jonathan Woodhouse, C. F. Bonney, Geo. B. Keezel and F. W. Davies; delegates to the International Independent Telephone Convention, Albert Parlett and C. F. Bonney.

Upon motion a rising vote of thanks was tendered the retiring president, Mr. Albert Parlett, for his untiring labor on behalf of this association during his two terms of office which have just expired, and for his kind and impartial manner in presiding over the deliberations of this association and its executive committee.

A vote of thanks was also tendered the secretary and treasurer, Mr. B. L. Fisher, for his active and efficient work in the interest of the association.

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In the Operating Field

NEBRASKA RAILWAY COMMISSION REFUSES BELL PETITION TO RAISE TOLL RATES.

THE request of the Nebraska Telephone Co. (Bell) for permission to extend the present day toll rates from six P. M. to ten P. M. has been refused by the Nebraska Railway Commission.

The commission decided, however, to allow the company to charge day rates for calls made in the daytime to make appointment calls for connections after six P. M.

It is reported that the commission will take up, in a thorough manner, the question of uniform rates throughout the state, as it appears that some companies do not adhere to the rule of charging for air line distance on long distance service.

WHICH WAY IS IT?

JUST now the Wisconsin railroad rate commission is investigating charges preferred against the Wisconsin Telephone Company in Milwaukee for insufficient and inadequate service.

In reports of replies of witnesses some remarkable testimony is given that is rather hard for a person to figure out unless he is well posted and "knows the ropes" on affairs of this nature. For instance, the testimony of one petite young lady, a former operator, indicates that an operator's switchboard position contains from forty to seventy subscribers' lines, that an operator answers an average of four hundred calls per hour, frequently going five hundred, and further, that the average time required for a connection is two and one-half seconds.

When one considers that the average number of calls per subscriber, ordinarily, is about seven to ten per day and that there are but sixty minutes to an hour it is rather difficult to determine whether the little operator is trying to fool the people and make them believe they are getting a lot for the service charges or endeavoring to make out a bad case against the telephone company, showing how over-crowded the operators are with work.

As to which side of the case will be most benefited by this testimony one can judge for himself. But really couldn't one just adore a girl that can squeeze a hundred and sixty-seven minutes' work into one short hour and occasionally beat even that?

MAYOR OF SPOKANE, WASH., SAYS BELL MUST PAY IF FRANCHISE IS GIVEN.

THE Mayor of Spokane declared in an interview recently that it is his intention to carry out his election platform promise that all corporations receiving franchises will be required to pay into the city treasury a certain percentage of its gross earnings. He says that if an application comes from the Pacific States Telephone Company for a renewal of its franchise he will examine and consider the proposition carefully in accordance with the views he has expressed relative to securing a revenue to the city.

The declaration was made when it was reported that the company **will ask** for the renewal of a twenty-year franchise granted to **W. S. Norman**, of Spokane, Dec. 14, 1887, effective five days after its passage. It is conceded that all the rights and privileges granted to W. S. Norman passed by transfer to the Pacific States Telephone Company. It is maintained, however, there is nothing in the franchise ordinance tending to grant a perpetual right or privilege, and yet the telephone company has not asked the city council for an extension of the grant, although the franchise, by its terms, will expire December 19. Under the provisions of the charter, a franchise granting an extension or renewal of rights and privileges must be published 30 days before it can be passed by the city council, and no proposed franchise can be published until it has first been presented to the council.

The failure of the company to prepare and present a renewal franchise has elicited general comment, and it is thought that the telephone company may have some form of joker which it will bring forth when the matter of renewal is laid before them.

FINANCIAL STATEMENT OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION, NOVEMBER 21, 1907.

Apportionments by Executive Committee for 1907-1908:

Associations.		Paid to Date.
Arkansas	$100.00	
California	300.00	$100.00
Canada	25.00	25.00
Illinois	750.00	
Indiana	1,000.00	100.00
Iowa	700.00	
Kansas	400.00	75.00
Kentucky	200.00	
Maine	25.00	
Michigan	750.00	
Missouri	500.00	150.00
Nebraska	350.00	
New York	300.00	
North Carolina	25.00	
Ohio	1,300.00	50.00
Oregon	40.00	
Pennsylvania	500.00	
Texas	100.00	50.00
Vermont and New Hampshire	25.00	
Virginia	50.00	
Wisconsin	250.00	
West Virginia	250.00	
	$7,940.00	$550.00
Contributions and Pledges:		
Switchboard and Telephone Mfrs., Trade Mark Equipment Stamps	$6,500.00	$360.00
Supply dealers and jobbers	5,000.00	
Engineers	250.00	
Journals	250.00	
Operating companies	750.00	240.00
Special	4,000.00	3,000.00
	$16,750.00	$3,600.00
General:		
Honorary membership fees	$750.00	$50.00
Merchandise accounts	319.74	
	$1,069.74	$50.00
Total		$25,759.74
Paid in		4,200.00
Balance to be collected		$21,559.74

Annual assessment 1c. per unit. A unit is an operating telephone or a circuit mile of toll line. Assessments are payable monthly, and are based on number of units in respective associations at last convention.

Fiscal year 1906-7, closed May 25.

Total receipts this year to date, including special committee balance		$17,940.80
Total expenditures, including accounts accrued before last Convention		14,884.94
Balance on hand		$3,055.86
Accounts payable	$443.47	
Estimated expense for next thirty days	1,753.25	
		2,196.72
Surplus November 21st		$859.14

DISHPAN GROUNDS FOR DRY SOIL.

TROUBLE on grounded telephone lines in regions where the soil is dry and sandy is very likely to result from poor grounds. Mr. R. T. Rossi suggested at the Colorado Electric Light Convention in September that in such soil the Northern Colorado Power Company has used for lightning arrester grounds a copper pan, so placed that whatever moisture descends from the ground above is held in the pan. This is the subject of an editorial comment in the last issue of the *Electrical World*, which refers to the fact that in the district where this form of ground is used the rainfall is so light that for much of the year the ground is very dry where there is no irrigation. It is therefore worth experimenting to find out whether a pan-shaped ground can retain sufficient moisture for some time after a rain fall to be useful. It is to be expected that in the course of a season the wet earth contained in the pan will gradually be transferred by capillary action to the surrounding dry earth. It is also conceivable that the earth or gravel all around might become so dry that even the moist dishpan ground would be fairly well insulated. It would probably prove worth while for telephone companies having trouble from grounds drying out to try this form and see how it works. We shall be glad, if any of our readers make experiments with these pan grounds, to have them let us hear how they work.

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By the Editor

BELL REBATING IN THE SOUTH.

AT a recent hearing before the Georgia Railway Commission at Atlanta one of the most interesting groups of facts brought out by the testimony of Vice-President W. T. Gentry, of the Southern Bell Telephone & Telegraph Company, was in relation to the methods which have been in force in cities where there is competition. Mr. Gentry, although not required to give his testimony under oath, requested that he be sworn, and subsequently, in what seems to have been a very full and complete statement of the company's methods of doing business, told how the rates collected from business subscribers in Savannah were actually a third less than the schedule charges. The precise method of granting this rebate was to publish a rate of $60.00 for business service, and allow to each business subscriber $20.00 worth of long distance messages free of charge, thus making the actual cost $40.00 per year. In residence sections where a house telephone was put in an extension was given free of charge, and in some instances it was even the practice to allow a rebate of 50 per cent. straight.

This testimony was especially interesting to Independent telephone men, as it established in an official way, by the admission of a prominent Bell official, the fact that rebates from the published rates have been granted. It has long been a stock argument with some of the Bell companies that rates have not been reduced as a result of competition. It is easy to see that in any such tables as have been made public, showing rates in cities of similar size where there was competition in comparison with others where there was none, if published rates were used when actual conditions were like those in Savannah false results would be given. Wherever this argument is used in the future Independent telephone companies will be able to combat it inferentially with this testimony, in addition to supplying facts derived from their own personal knowledge or that of responsible outsiders. It is interesting to note that Mr. Gentry testified further that his company had found this secret rate-cutting policy disastrous, as it had lost money steadily in Savannah, and as a consequence now proposes that no rebates shall be granted after the first of next January.

RETURNS OUR READERS MIGHT GET FOR THEIR SUBSCRIPTION MONEY.

NOT infrequently, as many of our readers know, subscribers send with renewals of their subscriptions to AMERICAN TELEPHONE JOURNAL brief letters telling what features of the paper they like, and how these things are useful to them in the work they do. From the reading of these letters the Editor always derives considerable pleasure, as is natural enough, but after all their real value consists in the straightforward pointers they afford in relation to the material which is most desirable for our pages. It is significant, as a key to the character of our readers, as shown by the object they have in mind when they read the Journal, that a very considerable proportion of such letters which come to us are apparently not considered by their writers to be complete unless they state in certain terms that their perusal of the articles published has been the means of producing a profit on the dollar invested. So it seems clear enough that the average man who reads the JOURNAL does so for strictly business reasons. He wants to make the time he spends in this way productive, as a means of enabling him to hold down his job better, or administer the affairs of his company so that it will produce a larger profit for the investors in its securities.

There are a great many telephone men who go much further than to tell what they have seen that they like. They tell what they want. They are not taking chances on the future, but if they do not see what they need they come right out and ask for it. When they get the first thing they ask for they come back and ask for another. These are the men whom we call the best subscribers on the list. The man who is so much alive that he feels that he must keep asking for more information about the business he is in shows clearly enough that he is likely to get ahead. And, going back to the consideration of a subscription to this JOURNAL as an investment, he is really the only man who shows that he applies business principles to the expenditure of his dollar. After the money goes out of his hands he may forget about the coin, but keeps his eye on the returns, and sees that they are just as big as he can make them. Thus he continues to realize on it to the fullest extent, just as he does upon larger sums which he puts into going concerns, and follows up by giving valuable suggestions to the manaement.

Perhaps not a few of our readers have failed to realize that this attitude is both respected and welcomed by the JOURNAL, and these may be a trifle diffident about telling their wishes, or they may be so hungry for information that they do not know what points to take up first, in order to get the right start. If they should ask our advice about it we should simply say—"Start in anywhere—only start strong." Not long ago the manager of one company wanted to get some information for his wire chief. So he sat down and wrote out a good long list of questions, each of which will require an answer of moderate length. Other men have written, from time to time, for information covering a broad field, requiring a special article to cover the ground properly. By putting in a little time in this way they find that they are able to set in motion an agency which supplies what they want with very little trouble to themselves. In doing so, since the problems of one man are likewise the problems of many, they are the indirect means of aiding a considerable number of men who have not yet reached the point of asking for information, but know just what to do with it when it drops into their hands.

In the telephone industry there are countless matters which are handled in altogether different ways in different sections of the country. The reason why many of these differences exist is often not so much that each particular method is the best adapted to the conditions which have caused its development. Far more frequently it is found that each was developed under the spur of necessity by a man who had no time to canvass the country, see what other people were doing, and copy or improve upon their plans. The result is that a single fundamental plan will carry one improvement here, another there, and so on—but only one improvement in a place. The proper thing, and the necessary thing to hasten development is for each man to find out in the easiest, most economical way what all these improvements are except his own. Let him tell that in such a way that everyone else will be made aware of it. It is in this way that every telephone man can best contribute a little to the development of the industry in which he is engaged, and aid his own progress.

A manager who will ask his wire chief, chief operator, cable foreman, and boss lineman to each send him in within a week twenty questions, the answers to which would be a genuine help in carrying on the company's work, and then pass the collection along to us with the suggestion that available answers be published, would be sure to stir up information that would not only be useful in hundreds of other places, but show results in his own exchange that would make him surprised that after having bought his ticket he had remained so long outside the show.

LOSSES FROM POOR COLLECTIONS.

IT seems to be generally agreed that poor collections are very much "up to" the manager. Upon another page are given percentage figures which, although unusually high, show the tremendous drain which a dilatory method of handling this department puts upon a telephone company's resources. The best remedy for this has been found to be simply a systematic, vigorous following up of subscribers. They need to be taught that the telephone bill is to be provided for on a certain date—and then not disappointed by a delay due to the company's own mismanagement.

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Telephone Cases and Decisions

CONDUCTED BY A. H. McMILLAN.

PAYING RENTAL UNDER DURESS.

One of our subscribers contracted to pay us rates for telephone service that have since been determined by decisions in other cases to be in excess of the rate prescribed by the city ordinance. This subscriber made his payments without protest and without any expression of unwillingness to do so. He says he never knew nor expected that the charge was in excess of the ordinance rate, and he would have had no fault to find if other parties had not conceived the idea that they could have our charges determined to be excessive and taken the matter into the courts. Now the fellow wants to recover back what he paid us and threatens to bring suit if we do not accede to his demands. Please tell us what his chance of recovery would be so we may know whether to settle with him or not, as we do not want to get into further lawsuits. D. C.

DURESS is personal restraint or fear of personal injury or imprisonment. However, there may be moral duress or duress of circumstances of such a nature as to entitle the person paying money to sue for its recovery. But this is not sufficient unless there was an unwillingness to pay and the unwillingness was overcome by a contemplation of the possible consequences of a refusal; to constitute duress the danger must not only exist but must be shown to have actually operated upon the mind and to have constituted the controlling motive for the performance of the act sought to be avoided. Where the person paying the money did not know or suspect, as in your case, that the charge was in excess of the ordinary rate, the payments could not be considered as made under duress, but were voluntary and can not be recovered.

REMOVAL OF TELEPHONES DOES NOT REQUIRE REMOVAL OF POLES.

Being a reader of the AMERICAN TELEPHONE JOURNAL, I desire to ask the following question: Owing to the fact that the Citizens' Telephone Company, of this place, raised the telephone rent of rural subscribers from $1 to $1.25 per month, the subscribers in different localities had their telephones removed. Do such subscribers have any right to demand that the telephone company remove its poles from the highways adjoining their farms? The telephone company has no franchise nor permit from said farmers. C. N. S.

THE removal of the telephones does not require the company to remove its poles from adjacent highways. In Indiana, the state from which this inquiry comes, it has been held that the poles and wires of a telephone company are not an additional servitude in the street, entitling the abutting owner to compensation. MaGee vs. Overshiner, 150 Ind. 127, 40 L. R. A. 370, 49 N. E. 951.

VOTING OF STOCK ENJOINED.

THE Northwestern Telephone and Telegraph Company at Carthage, N. Y., has been served with two injunctions. The one is an order restraining the board of directors from voting any stock at the annual meeting other than the original 339 shares, and the other restrains the directors from issuing any more stock unless authorized by the stockholders.

These injunctions are another phase of the telephone conflict which has been raging since the Carthage company and the Bell telephone interests were combined in May. It is a continuation of the suits instituted by James K. Whitaker of New York, a stockholder of the company, to secure control of affairs from the local stockholders.

REGULATION OF RATES AT LOS ANGELES.

IT has been held that the charter in the city of Los Angeles, at the time of the passage of ordinances granting a franchise to the Home Telephone Company, conferred upon the city the power to regulate charges for telephone service, and that this power was not surrendered nor abridged by the granting of a franchise to the company or otherwise, nor do these ordinances contravene any of the provisions of the constitution of the United States. The telephone company sought a decree declaring certain ordinances void, and enjoining their enforcement. These ordinances fixed rates of from $5 per month for business houses, to $2 per month for residences, and allowed the Sunset Telephone and Telegraph Company, a competitor, to charge rates in excess of those permitted to the Home company. The original franchise gave the company the right to charge not to exceed $60 per annum for business telephones and $30 per annum for private telephones, until the exchange comprised more than ten thousand telephones, after which the rates should not be increased by more than a sum equal to $6 per annum for each one thousand telephones connected in excess of the ten thousand. In consideration of this franchise, the telephone company furnished thirty telephones to the city *gratis*, and also provided one hundred and fifty pairs of wires in its conduits and the upper arms of its poles for the use of the city's police and fire alarm telegraph system, and agreed to pay a two per cent. gross earning tax.

The court held that by this franchise the city did not surrender its rights to regulate rates for the fifty-year term of the franchise, but that the city was entitled to reduce the rates below the maximum charge so fixed, during such term. The court further held that the subsequent passage of the ordinance establishing lower rates and the maximum provision in the franchise was not an impairment of the obligation of the contract between the company and city; neither was the passage of such ordinance without notice unconstitutional as depriving the telephone company of its property without due process of law.

On the question of unlawful discrimination, it was decided that the mere fact that different rates were prescribed by ordinance for two companies operating telephone lines within the city had not in itself established unlawful discrimination against either. Home Telephone Company vs. Los Angeles, 155 Fed., 554.

LEASING OF LINES IN KANSAS.

Is there any law of the State of Kansas forbidding us to lease a small rural line near here? We desire to lease it with the view of purchasing it, the arrangement being that we buy it upon payments, and when we have had it leased for a certain number of years, and have made certain total payments, the line becomes ours. If we do not pay for it, it is to be considered as leased to us during the time we have had it. G. N. W.

THERE is no statutory provision of the State of Kansas which will hinder your plan in any way. In fact, the laws of the State (General Statutes of 1901, Sec. 1345) provide that one telephone corporation may lease and acquire other lines by lease or purchase and may join with other corporations in constructing, leasing, and owning lines of telephone.

SETTING POLES ALONG RAILROAD RIGHT OF WAY.

IN the U. S. Circuit Court for the Southern District of Georgia, a case arose in which the proper method of setting poles along the right of way of a railroad company was discussed. The Georgia Railroad & Banking Company sued to enjoin the Atlantic Postal Telegraph Cable Company from maintaining proceedings to condemn a right of way for its pole lines along the railroad's right of way. The railroad company claimed that the proposed line would menace the safety of the company's trains and obstruct its business. Much testimony was taken on the subject, but the Court was finally convinced that the decision of a lower court holding the maintenance of such a line no menace to the safety of trains was correct. It was proposed to place the poles not nearer than 8 feet from the rail, and to have them 12 inches in diameter, and set 4 to 8 feet in the ground. This construction was practically sanctioned by the Court. The railroad company alleged that it was entitled to an injunction because its right of way was encumbered by a rival telegraph line, but this the Court held to be incorrect, because a contract between a railroad company and a telegraph company, by which the latter has granted an exclusive occupancy of the railroad's right of way for its lines and poles is void. Ga. R. & B. Co. vs. Atlantic Postal Teleg. Cable Co., 152 F. 991.

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Among the Querists

INSULATION RESISTANCE TEST WITH WHEATSTONE BRIDGE.—(949.)

Kindly publish in an early issue of AMERICAN TELEPHONE JOURNAL method of making insulation tests with Queen portable Wheatstone Bridge. Please show diagram and give formula. W. E. A., Conn.

AS you specify the particular Wheatstone Bridge you are using we indicate the lay-out and connections of your instrument in Fig. 949*a* so that you may readily follow the plan outlined for making insulation tests. This test is very simple, as all readings are by the direct deflection method. Following Fig. 949*a*, connect a known high resistance, of say 100,000 ohms to the line post *C* and to the positive battery post. Remove all plugs from the commutator indicated by *A, R, B, X,* and have all plugs in the rheostat, as any resistance unplugged in the rheostat will be in circuit with the galvanometer and battery. After arranging the battery tips to connect with one cell only, press the keys. A deflection of about eight divisions will be obtained. This deflection, it will readily be noted, is due to the current from one cell through the 100,000 ohms. Then multiplying the resistance by the deflection we have, as a result, that resistance through which one cell will produce a deflection of one division, thus securing the constant of the galvanometer.

Replacing the known resistance with the conductors, the insulation of which we desire to measure, and adding additional

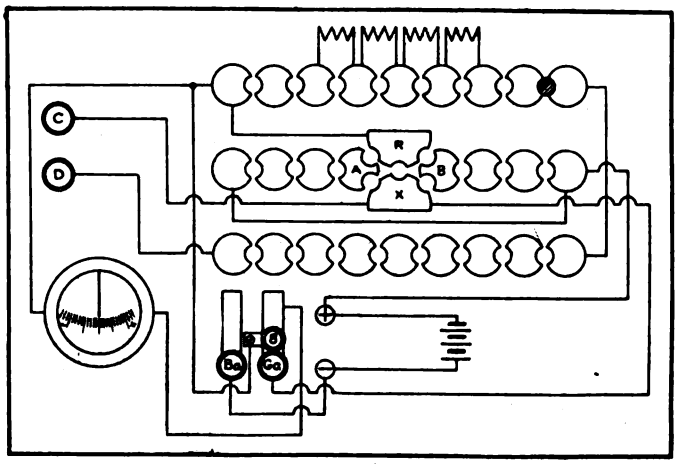

Fig. 949a.

cells, we again secure a reading. Multiply the galvanometer constant, expressed in megohms, by the number of cells used, and divide by the number of scale deflections of the second reading. The result is the insulation resistance expressed in megohms.

If a high resistance is not at hand, one may be readily made for temporary use by marking with a soft pencil on a strip of ground glass, as shown in Fig. 949*b*. Connect the glass by means of tinfoil ends to the posts of the set, and measure its resistance in the customary manner, adding or removing a small amount of graphite until the desired value is secured.

The resistance may be reduced by additional pencil lines on the glass or increased by breaking the continuity of some already there or diminishing their width. This resistance should be tested every time it is used, as it will vary considerably with handling.

FALSE GROUNDS ON MAGNETO SYSTEM.—(950.)

We have in our system the common magneto telephones with push button for silent calling of central by ground. But we have one circuit where the parties on the lines cannot get central in that way and we have to have a plug in the switchboard so they can call without the push button, in which case the clearing-out drop falls. This circuit has not worked very well since it was put up and telephones installed, but sometimes some one or two of these telephones will ring in by the push button. We also have two or three other circuits which will not ring in by ground at times, especially in wet weather, but at other times seem to be perfect. We think we have each telephone well grounded and of course the switchboard also, but have not been able as yet to locate the trouble. Can the editor aid me by suggesting where we would be more apt to find the trouble, and what we should look for? C. K. M., New York.

YOUR trouble is due to false grounds on your line which may be caused by several things. Probably your lines are not free from trees, you may have broken insulators or your guy wires may be touching the line at times. There are

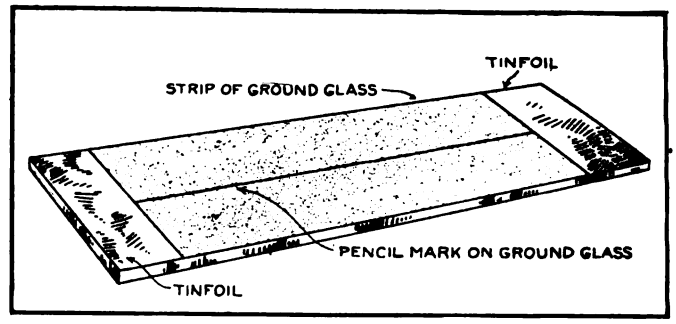

Fig. 949b.

numerous things which may cause your trouble, but the most probable one is leakage through trees.

In ringing central grounded your generator current will naturally divide between central and the false ground and if this ground is sufficiently great you will not get enough current into the central office to throw the drop.

When you have the telephone connected as you state, you ring metallic and as your instrument is not grounded, therefore the false ground need not be considered, as one ground will never cause trouble, it is only when you have a second ground that your trouble will commence.

We would suggest that you go over your lines carefully and remove anything that might cause grounds.

WEIGHT AND RESISTANCE OF COPPER WIRE.—(951.)

Will you kindly advise in what book or publication I may be able to find a schedule of the weight and resistance of hard drawn copper wire, from Nos. 5 to 20, B and S gauge. I would also like to secure the number of feet per pound of wire of these gauges. An early reply, either by mail or through the columns of your valuable publication, will be much appreciated. T. H. B., Pa.

WE cannot advise you as to any publication giving you the information you desire; however, we have given the weight and resistance of copper wire, per thousand feet and per mile, the number of feet per pound, as well as other information in Table 951.

COPPER WIRE TABLE.

No. B.&S.	Ohms Per Foot.	Ohms Per Mile.	Feet Per Ohm.	Weight Per Foot.	Weight Per Mile.	Feet Per Pound.	Diameter in Mils.	Circumference in Cir. Mils.
5	.0003074	1.6889	3253.09	.1	529	9.98	182.	33124.
6	.0003879	2.1295	2577.981	.079	419	12.58	162.	26244.
7	.000491	2.6850	2036.65	.063	331	15.87	144.	20736.
8	.0006214	3.3859	1609.27	.05	262	20.01	128.	16384.
9	.0007834	4.2769	1275.082	.039	208	25.23	114.	12996.
10	.0009785	5.3848	1021.972	.032	166	31.82	102.	10404.
11	.001229	6.7869	813.661	.025	132	40.12	91.	8281.
12	.001552	8.5633	644.323	.02	105	50.59	81.	6561.
13	.001964	10.794	560.08	.0157	83	63.79	72.	5184.
14	.002485	13.612	402.414	.0124	65	80.44	64.	4096.
15	.003133	17.165	319.179	.0098	52	101.4	57.	3249.
16	.003914	21.646	255.55	.0079	42	127.9	51.	2601.
17	.005028	27.294	196.732	.0061	32	161.3	45.	2025.
18	.006363	34.416	157.014	.0048	25.6	203.4	40.	1600.
19	.007855	43.400	127.051	.0039	20.1	256.5	36.	1296.
20	.009942	54.749	100.582	.0031	16.4	323.4	32.	1024.

Table 951.

As this table contains just the information in relation to copper wire that is most often needed by telephone men in actual practice, the editor would suggest that it be cut out and mounted in some convenient place where it might be readily referred to when needed.

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WANTED—Position as general foreman for telephone manufacturer of instruments or inside wiring or line construction; can give best of references, also refer to the company I am now with. Address Box 979, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 979

WANTED—Six good common battery switchboard installers. Give reference and state fully experience. Also state rate of wages per hour expected. National Telephone Co. of West Virginia, Wheeling, West Va. 962

WANTED—$5,000, 5 to 10 years' time, 6 per cent. interest. Interest payable annually or semi-annually. Security gilt-edge. Address Box 945, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 945

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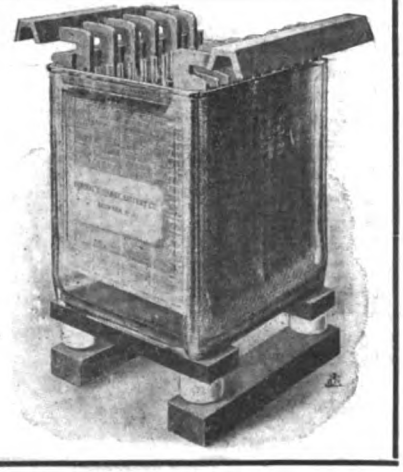

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Patents Recently Granted

RINGING DEVICE FOR TELEPHONE EXCHANGES.

W. W. Dean, Elyria, Ohio, patent 872,293, Nov. 26, 1907, assigned to Dean Electric Co.

The device described in this patent contemplates the use of a ringing relay in the cord circuit adapted, upon energization by the operator, to open the cord circuit and connect the generator across the terminals of the calling plug. In connection with this relay is a thermic relay so adjusted as to open the generator circuit and complete the cord circuit when the called for subscriber has responded.

PARTY LINE TELEPHONE EXCHANGE.

S. A. Norstrom, Chicago, patent 871,519, November 19, 1907, assigned to C. L. Redfield, Chicago.

This patent covers an arrangement of magnet, ratchet and other circuit controlling devices at each substation on a party line for the selective signalling of a desired station, and the locking out of other stations on the line, operated on the step by step principle. The invention covers a means whereby switching mechanisms may be simultaneously advanced from their normal positions, and selected mechanisms thrown out of step with others on the line for the purpose of effecting the desired connection.

RECEIVER.

H. E. Booth, Salt Lake City, Utah, patent 871,470, Nov. 19, 1907.

In this receiver the ear piece is made of unusual length, and in its front portions is set a partition of some porous, non-vibratory material, such as cloth or cotton wadding. The inventor claims that this, when placed at the proper distance from the diaphragm, removes the unpleasant effect produced by the sudden changes of potential, which cause clicks in the receiver, without reducing the clearness of speech reproduced in the receiver.

HEAT-COIL RESOLDERING DEVICE.

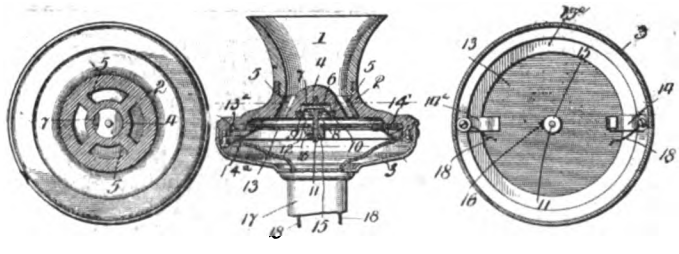
F. B. Cook, Chicago, patent No. 869,864, Oct. 29, 1907.

In order that heat coils in thermal protectors which have been operated by the flow of excessive current through them, may be restored to an operative position, the device described in this patent is provided. This comprises a plug having three springs. To two of these springs are connected the terminals of a battery. These springs are placed against the springs connecting with the terminals of the heat coil, thereby causing the battery current to flow through, reheating and automatically resetting the heat coil.

TRANSMITTER.

R. Hansen, Chicago, patent 872,284, Nov. 26, 1907, one-half assigned to A. M. Belfield, Chicago.

The transmitter described in this patent is one in which the resistance chamber is attached on the outer side of the diaphragm, extending forward into the mouthpiece. The piece 2 is constructed with a central lug or enlargement 4 conveniently

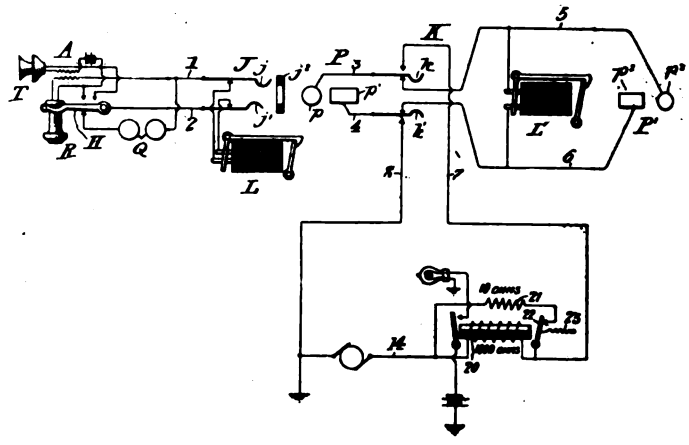


held in place by arms 5. This lug 4 is provided with a small central chamber which is filled with granular carbon. An electrode 7 is arranged at the front of the chamber, and another electrode 8 is arranged at the rear. The rear electrode 8 is provided with a rearwardly extending pin or spindle 11, and on this is placed a small nut 12 which serves to secure the electrode and mica diaphragm 9 together and also acts as a means of adjustment.

PROTECTION FOR RINGING LEADS.

W. W. Dean, Elyria, Ohio, patent 872,171, Nov. 26, 1907, assigned to Dean Electric Co.

This patent provides a means for the protection of operator's ringing leads from short circuit and comprises a high resistance relay 20, with a back contact armature 22 provided with a low resistance shunt circuit. The relay is so adjusted that it will



not pull up under normal ringing conditions, but when the operator rings on a short-circuited line, the consequent large flow of current effectively energizes the relay which pulls up its armature, thereby breaking the low resistance shunt circuit and causing the current from the generator to traverse the high resistance relay windings.

CALLING DEVICE FOR TELEPHONE EXCHANGES.

Frank A. Lundquist, Chicago, Ill., patent No. 870,634, Nov. 12, 1907.

The system described in this patent is intended for the use of subscribers at the local station of an automatic telephone exchange and is particularly adapted to calling station numbers of two or more figures. The apparatus comprises a dial having figures on its face by means of which the apparatus is set to the desired point and making a series of electrical contacts which cause a series of electrical impulses to be sent upon the line thus making the desired selection.

TRANSMITTER.

E. E. Ries, New York, patent 871,737, November 19, 1907.

This transmitter is intended to vary the resistance in a telephone circuit by the employment of the principle of capillary attraction. The vibration of the transmitter diaphragm is adapted to vary the thickness of the space between itself and another diaphragm set close to it. A liquid, suitably disposed in a retaining vessel, has its movement controlled, according to the familiar principle of capillary attraction, by the variation in distance between the two enclosing plates. The electrical resistance of the circuit between the diaphragm and the other electrode, through the liquid, is varied in accordance with the changes in the extent of electrode surface covered by the conducting liquid.

PROTECTOR TESTING AND RESETTING PLUG.

F. B. Cook, Chicago, patent 869,554, October 29, 1907.

This invention covers a plug carrying springs adapted to make connection with terminal springs of protective devices on a main distributing frame. Certain springs on the plug are intended to be connected to battery, for the purpose of operating a heating coil. By the insertion of the plug in the protector springs, and its proper manipulation, the heat coil may be tested to see if it is in suitable condition to operate, and the withdrawal of the plug automatically resets the coil. This plug may also be used as a terminal for testing circuits to the wire chief's desk, for making regular in and out tests for trouble.

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¶Some transmit them clearly and distinctly.

¶Some do this without effort on the part of the persons talking.

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To toll line operation and one that no exchange manager can afford to be without. The savings effected, the increase in earnings possible and the increased efficiency of toll operators, where the Calculagraph is used, can be secured by no other means.

IT MAKES NO CLERICAL ERRORS

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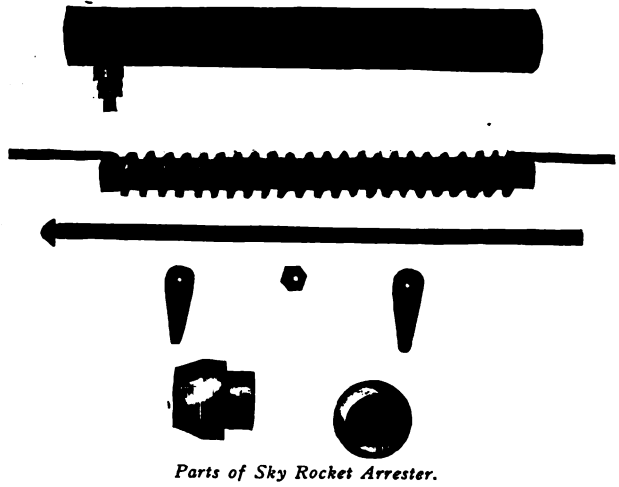
SKY ROCKET ARRESTERS

Is constructed in a manner best adapted to perform the functions for which it is intended and to allow a maximum of wear and rough usage.



Parts of Sky Rocket Arrester.

With Sky Rocket Arresters installed on your lines your troubles from lightning disturbances are at an end.

WRITE TO-DAY FOR SAMPLES AND PRICES.

CHANCE MANUFACTURING COMPANY
CENTRALIA, MO.

See our exhibit at Electrical Show, Chicago, Jan. 13-25, 1908.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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With the Manufacturers

CRACRAFT, LEICH—AN IMPORTANT NEWCOMER IN THE INDEPENDENT MANUFACTURING FIELD.

IF strong personalities and ample experience in the manufacturing and selling of telephone apparatus count for anything, the organization of the Cracraft, Leich Electric Company is such as to carry the new concern speedily to a place among the leaders who are supplying the best grade of equipment to the Independent telephone companies of to-day.

A few months ago J. P. Cracraft and O. M. Leich left the Stromberg-Carlson Telephone Manufacturing Company to purchase the plant of the Eureka Electric Company at Genoa, Ill. Although it had been recognized that this company was quietly turning out considerable apparatus of very good quality, it was apparent that there was room for considerable improvement all along the line and Messrs. Cracraft and Leich immediately set to work to build up an organization capable of turning out equipment of the very highest quality, such as alone is purchased by the progressive Independent companies. The abilities and experiences of the two men at the head of the organization have amply fitted them for the important work which they have undertaken.

Mr. J. P. Cracraft, President Cracraft, Leich Electric Co.

Mr. Cracraft, the president of the company, is a graduate of the University of Kansas and from the time he left high school to the completion of his college course he spent all his summer vacations with electric light, street railway, telegraph and telephone construction crews. Here he gained information which has been most valuable to him in the telephone manufacturing field. Upon graduation he went to work in the shops of the Western Electric Company, and his marked ability caused him to be consistently advanced through the different departments of the shop, the drafting room and various positions in the engineering department until he was given the position of chief installer. At this time he was able to make himself intimately familiar with the operating side of the telephone business, and his exact knowledge of what is wanted and needed by operating telephone companies made his subsequent service as a branch house manager very valuable to the company. This was the beginning of his sales experience, which has constantly broadened during succeeding years when he has held important positions with the Stromberg-Carlson Telephone Manufacturing Company. As Western manager he was for four years in charge of the Chicago office and factory, and for the past year he has been chief sales manager of the Stromberg-Carlson Company. During the later years of his experience he has made himself known to Independent telephone companies all over the country, and built up a strong reputation for his business abilities and methods.

Colonial Lantern, for Advertising Independent Pay Stations, Sold by International Association.

Not only in the business department, but in the designing and manufacturing sides is the new organization particularly strong. Mr. O. M. Leich, secretary and chief engineer, who is in direct charge of all designing, has long been known to those who have followed the development of Independent telephone apparatus. After graduating from the University of Wisconsin, he for the past eleven years devoted his entire time to the telephone industry, first with the Western Electric Company, then with the American Electric Telephone Company, and finally, up to the time of his association with Mr. Cracraft, with the Stromberg-Carlson Telephone Manufacturing Company. During the past four years he has had entire charge of the designing of apparatus turned out by the latter organization. His invention of the Leich party line system, based upon fundamental discoveries of the principles of harmonic ringing, has attracted general attention to his abilities as a designer, and in fact it has been said by a man in a position to know, that Mr. Leich ranks without doubt with the four best telephone designers in the world to-day.

Mr. O. M. Leich, Secretary and Chief Engineer, Cracraft, Leich Electric Co.

Improvements in shop methods which will enable the company to turn out a product having in a high degree the essential qualities of durability and uniformity have been worked out by Mr. Neils Pederson. For the past three years he has been in full charge of the experimental and development work of the Stromberg-Carlson Company. Previous to that time he held a like position with the Westinghouse Electrical Manufacturing Company and he is known as a man of exceptional ability in the line of manufacturing high grade electrical apparatus.

Electrical and telephone laboratories of the company will be in charge of Mr. Alexander C. Reid, a man who has had extensive practical experience with operating companies and has for several years been at the head of electrical and telephone laboratories of the Stromberg-Carlson Telephone Manufacturing Company.

Two other strong men drafted from the forces of the Stromberg-Carlson Company are Frederick G. Hudson, who has for the past seven years been chief clerk and assistant manager of the Chicago offices, and J. H. Wagoner, who has had extensive experience in the sales department. Both of these men are thoroughly familiar with telephone organizations and conditions in all parts of the country. With these new men are associated the strongest members of the former Eureka organization,

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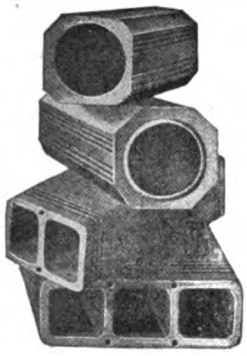

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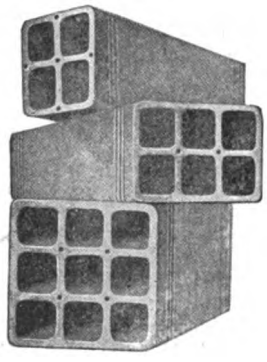
SINGLE and MULTIPLE DUCT



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Factories: New Jersey, Pennsylvania, Ohio

Standard Vitrified Conduit Company

Main Offices: 39-41 CORTLANDT ST., NEW YORK, N. Y.

GRAY PAY STATIONS

Carried in St. Louis and Dallas stock and sold at Factory Prices.

DROP THE COIN. THAT'S ALL.
NO LEVERS TO PULL.
NO CHANGE OF SIGNALS FOR DIFFERENT PAY STATIONS.

All Gray Pay Stations, large or small, have same code of signals. The public must not be required to do anything other than deposit the coin. Prices no more than for inferior kinds. Fully illustrated catalog on request.

Central Telephone & Electric Company

Makers of High-Grade Telephone Apparatus

Main Office and Factory:
2131-37 Lucas Ave., ST. LOUIS, MO.

Dealers in Telephone Supplies (Exclusively)

120 Liberty Street, New York City
105-7 Commerce Street, Dallas, Tex.

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who have been retained by the new heads of the company.

Since Messrs. Cracraft and Leich took charge, the entire force has been putting in the hardest kind of work with just one object in view—to put the factories in condition for turning out apparatus of the highest quality. Every man in the shops is being drilled to do his work in such a way as to produce the best goods and this is the ground on which the company will stand in its relations with its customers. Additional buildings, tools and equipment have been provided and thus the company has excellent facilities for handling its work well and economically, to say nothing of the increased capacity of the plant thus obtained as a means of providing for assured growth.

The factory is at Genoa, Ill., one and one-quarter hours' ride out of Chicago on the main line of the Chicago, Milwaukee & St. Paul and the Illinois Central railways and has exceptional shipping facilities in all directions.

Equipment which is being put on the market at present includes a line of generator call and central energy wall telephones and standard switchboards which are said to be just as good as the best engineering knowledge and manufacturing methods of the present time can turn out.

BARGAINS IN ADVERTISING LANTERNS.

LOW prices mark the final effort of the International Independent Telephone Association to secure the prompt clearance of the stock of Colonial lanterns remaining in the supply department which has formally been discontinued.

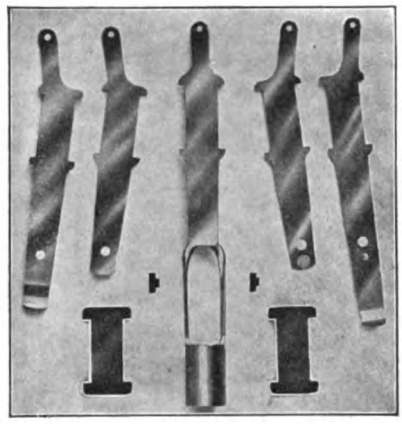
It is generally recognized that at night the ordinary unilluminated signs do not sufficiently attract attention to Independent telephones and a great deal of local and long distance business is lost as a consequence. Where these lanterns have been used, it is understood that they have decidedly made good, and been the means of considerably increasing pay station receipts. The lanterns which the Association is closing out were bought not merely on account of their attractive appearance, as shown in the accompanying illustration, but because they are superior goods and very well made. They are equipped for either electric light, gas or oil and are splendid specimens of the signmaker's art and so designed from all points of view as to be strictly up to date.

The original prices for these goods were $15 and $13.50 respectively for large and small sizes, but now in order that they may be disposed of quickly, they are offered for the extremely low prices of $12.75 and $11.35 for the respective sizes.

The Association is anxious to dispose of its remaining stock so that it can complete its contract with the manufacturers, and also avoid further expense of looking after details in connection with the supply department. It therefore has made not only the marked reduction in prices as above mentioned, but will give *an additional discount of* 10 *per cent.* from the low prices on orders received before the first of January, *provided the purchaser mentions the name of* AMERICAN TELEPHONE JOURNAL *when he writes.*

Independent companies who are keen about keeping their toll lines working evenings and want to get the most out of their pay station equipment, will undoubtedly see to it that these bargains do not last long, and the people who send in the first orders will be the ones to get a good return on a small investment.

THE STROMBERG-CARLSON NEW TYPE SPRING JACK.



Contact Members, Supporting Pieces and Insulating Material Used in Make-up of Stromberg-Carlson Jack.

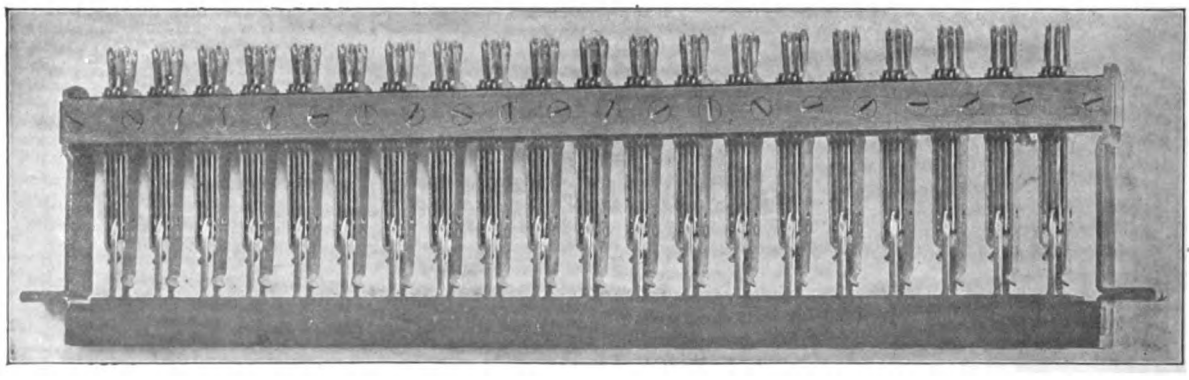
THE principle of designing unit parts of spring jacks, mounted in banks of 5 or 20, so that the combined assembly of the strip of jacks will result in an even distribution of the greatest strength at all points in the entire length of strip is particularly noticeable in the design illustrated with this article.

The force applied at all points on the strip by the constant inserting and withdrawing of plugs is the cause of the rapid depreciation of spring jacks that are weak in mechanical construction and is the source of the greatest portion of trouble common to every type of switchboard. The mechanical features that are characteristic of this new design are intended to eliminate all possibilities of trouble in the jack unit, and combine many economical ideas in the design of parts.

By referring to the illustration of the entire strip it will be seen that the end lugs, formed of sheet brass, support the clamping and retaining strips at the back, in addition to providing a means for fastening the jack strip in the section. These lugs are fastened and formed in such a manner that they have no chance to become loose. The forms of the contact springs and insulations of each jack make every unit self-supporting and independent of its neighbors. The result of this construction is strength and uniformity, and it does away with extra parts not useful in the assembly.

A common fault with spring jacks of this type is due to a degree with the form of the contact springs. It will be noticed that the maximum width of the springs in this design is retained throughout, and the small ears or lobes are added at the point where the spring is held. These ears are added instead of taking away a portion of the metal so that the spring will fit over a mounting strip. This form thus prevents the spring from moving backward or forward and at the same time maintains the greatest strength the spacing between jacks allows at this point. It will be seen also that the thimble or main spring is a direct support through the center of each unit.

The Stromberg-Carlson Company is furnishing this style of jack with its various switchboards.



Strip of Jacks of the New Stromberg-Carlson Type.

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IRONITE

Duplex Drop Wire

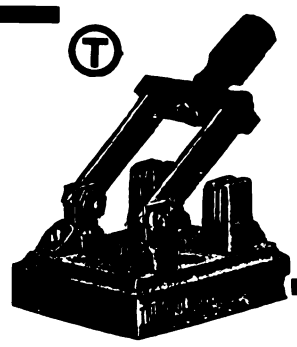
Never breaks inside the insulation. Every trouble man knows how hard it is to locate such a break and stop the trouble.

IRONITE will not sag or stretch. It is as flexible as hard drawn copper and will not break when twisted or "kinked."

The insulation of **IRONITE** is absolutely unequalled. **There is no satisfactory substitute,** and most important of all, **IRONITE costs 25% less than copper, even at the present low price of copper.**

Durant Electric Supplies Co.
52 Fifth Avenue, Chicago, Ill.

TRUMBULL TELEPHONE SWITCHES



PRICE GREATLY REDUCED

CAT. No.		LIST	STD. PKG.
707	S.P.S.T.	$ .20	150
708	S.P.D.T.	.32	100
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710	D.P.D.T.	.50	50

SUBJECT TO YOUR REGULAR DISCOUNTS

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SELF-ADJUSTING CLIPS HELD FIRMLY IN RECESSES IN THE BASE INSURE A PROPER ALIGNMENT

SELECTED PORCELAIN USED EACH SWITCH INSPECTED

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RESULTS

During the past ninety days we have submitted over five-hundred "LONG DISTANCE" transmitters to as many of the representative exchanges in the country, with the request that they use the sample for thirty days and then return it to us at our expense if they were not so well pleased with them that they wished to keep and pay for the instrument.

We have received remittances from over 90% of all who have had the transmitter in service thirty days, and every mail brings us letters similar to this one—

Ozark, Ala.,
Nov. 12, 1907.

Gentlemen:

We are well pleased with the transmitter. The other operator wants one also, so we send you check to cover another transmitter like the one we have.

OZARK TELEPHONE CO.

May we send you one now on the same conditions?

LONG DISTANCE TELEPHONE MFG. CO.
Makers of
"BETTER" Telephones
SOUTH BEND INDIANA

THE STANDARD
"HEMINGRAY"
All With The
"Patent Drip Petticoats"

THE HEMINGRAY-GLASS CO.
Office, Covington, Ky.
Factory, Muncie, Ind.
Established 1848

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Notes From the Field

NEW COMPANIES.

JONESBORO, ARK.—An Independent telephone company has been organized by the farmers and merchants of Jonesboro, and arrangements have been completed for the starting of a telephone system at an early date.

OAKLAND, CAL.—The Oakland Transcontinental Aerial Telephone and Power Company has filed articles of incorporation. The capital stock is $200,000. The directors are A. G. Rockel and W. H. Shadburne, of Oakland; A. Johnke, of San Francisco, and H. P. Dwyer, of Fruitvale. This company states that its purpose is to transmit telephone and telegraph messages with or without metallic circuits or wires.

BLACK HAWK, IND.—The Pierson Mutual Telephone Company has been incorporated to build, equip and operate a telephone exchange and system in the town of Black Hawk and throughout the western portion of Vigo County. The directors elected are B. F. Beard, H. Tyron, G. C. Smith, S. C. Elliott and Samuel Tyron.

HARLAN, IND.—The Harlan Telephone Company has been organized, and has taken over the business which was formerly conducted as a partnership at this place. About two hundred subscribers were served by the old management, but it is the intention of the new company to greatly extend its service, and make many improvements in the plant. It has an authorized capital stock of $25,000, and the following officers and directors have been elected: President, John H. Zimmermann; secretary, Frank Dalrymple; directors, J. H. Zimmermann, Frank Dalrymple, Horace H. Horn, Charles Nettlehorst and E. G. Hoffman.

PRAISE, KY.—The Marrowbone Telephone Company has been organized, and contemplates the construction of a telephone system from Praise, via Hartley and Lookout, to Marrowbone, a distance of about twenty-five miles. The capital stock is placed at $3,000, and among the incorporators are J. B. Polley, Ira Jones and H. C. Yarnell, Praise, Ky.

TOLONA, KY.—The Tolona Telephone Company has been incorporated to build, equip and operate a telephone system in Tolona and other portions of Monroe County. The capital is given as $2,000.

ONEKAMA, MICH.—A rural telephone company has been incorporated in this city to furnish service in Onekama and the adjacent territory. Toll lines will connect with Bear Lake and Manistee. Address R. F. Wendel, Manager.

BRECKENRIDGE, MINN.—An Independent telephone company will very likely be established by the leading business men of this city at an early date, owing to the dissatisfaction caused by the service and the rates of the Northwestern Telephone Company (Bell).

WELLS, MINN.—Plans are under way for the formation of a Farmers' Telephone Company in this city.

CARTHAGE, MO.—The Garden Dell Telephone Company has been organized by the farmers northeast of Carthage, and work on the construction of its system has already been commenced. It is the intention of the organizers to establish connections with the Home Telephone Company at Purcell.

GENEVA, NEB.—The Golden Rod Telephone Company has been organized in this city and the following officers have been elected: J. N. Taylor, president; Ed. Linnert, vice president; G. A. Churchill, secretary, and Fred Meyer, treasurer.

SPENCERPORT, N. Y.—The Ogden Telephone Company has been organized, and expects to construct a telephone system between Spencerport, Ogden, Parma and other adjoining towns. Connections are also to be established with Adams Basin, at which place the citizens, having become dissatisfied with the service rendered to them by the Bell company, have already subscribed $4,000 towards the installation of a new Independent exchange.

ALDEN, OKLA.—The Alden Telephone Company has been incorporated with a capital stock of $1,000. The incorporators are S. H. Sturgis and S. J. Carpenter, of Alden; E. H. Stewart and W. L. Dunlap, of Carnegie, and Fred Brasted, of Oklahoma City. This company will operate a telephone system in Alden and adjacent territory.

MARKLE, PA.—The Markle Telephone Company has been organized for the purpose of supplying telephone service to the cities of Markle, Merwin, Milligantown and the adjacent farming community. Address Andrew Kautzman, president.

DELL RAPIDS, S. D.—The Buffalo County Telephone Company has been incorporated with a capital stock of $25,000. The incorporators are J. V. Drips, A. G. Hill and G. W. Frazer, all of Gann Valley. It is the intention of this company to construct and operate a system for telephone communication in Buffalo and adjoining counties.

LIPPS, VA.—The Guests River Telephone Company, which has a capital stock of $6,000, has been organized for the purpose of constructing a telephone line from Norton, via Lipps, Va., to Flat Gap, Ky., a distance of thirty miles. Washington Bowling, Flat Gap, Va., is the manager of the new company.

WAUPACA, WIS.—The Baldwin Mills Telephone Company has been incorporated with a capital stock of $2,500 to install and operate a system of telephones in this city. The incorporators are E. T. Mather, Chas. Rasmussen and Taylor Looker.

COTTAGE GROVE, WIS.—The Cottage Grove Telephone Company has been incorporated at this place with a capital stock of $10,000. Among the incorporators are H. G. Clark, O. M. Donkle, E. C. Alsmeyer, A. Uphoff, A. T. Nelson, William North and G. A. Buckert.

FRANCHISES.

SERGENT, KY.—The Ola Telephone Company, Sergent, Ky., of which W. B. Webb is manager, is securing franchises for the extension of its line to Evans and Hilliard, Ky., and construction work is to be commenced at once.

NORWAY, ME.—Permission to construct telephone lines in this city has been granted to the Oxford and Otisfield Telephone Company.

SLATER, MO.—Application for a twenty-year franchise at this city has been made by G. T. Newton, T. H. Harvey and E. P. Purcell, of Marshall, who represent the Saline County Telephone Company. If it is obtained, the company promises to install new switchboards and greatly improve its service in the town.

BUTTE, MONT.—The Independent Telephone Company has been granted permission by the county commissioners to extend its system along the county roads, and work on the construction of a line on the county road south of Butte is to be commenced at once.

KNOXVILLE, O.—A franchise has been granted to the Knoxville Rural Telephone Company to operate a system of telephones between Knoxville and Osage, Knoxville and Toronto, Knoxville and Empire, and Knoxville and New Somerset. The company will also operate a system of telephones in the city of Knoxville.

GUANAJUATO, MEXICO, MEX.—An American company, represented by F. W. Updegraft, has been granted a concession to operate a telephone system in the city of Guanajuato.

FINANCIAL.

OTTAWA, ILL.—The Ottawa Home Telephone Company has decreased its capital stock from $150,000 to $60,000.

CLAY CENTER, KAN.—At a recent meeting of the directors of the Clay Center Telephone Company a four per cent. dividend was declared on its preferred stock, and a one per cent. dividend on its common stock.

HINDMAN, KY.—The Hindman-Prestonburg Telephone Company, Hindman, Ky., of which S. R. Blain, of Pine Top, Ky., is manager, has increased its capital stock from $5,000 to $7,000, and expects to use the increase in extending its system.

MURFREESBORO, N. C.—At its annual meeting the North State Telephone Company of this city declared a dividend of eight per cent. to the stockholders.

COLUMBUS, OHIO.—The Columbus Citizens Telephone Company at a recent meeting of the board of directors declared a regular quarterly dividend of one per cent on the common stock of the company.

CHIPPEWA FALLS, WIS.—The Chippewa Falls Telephone Company, whose business shows an increase of twenty per cent. over the previous year, has declared a dividend of six per cent.

ELECTIONS.

FOREST CITY, IA.—The following directors were elected by the Winnebago Telephone Company at its recent annual meeting at Forest City: H. A. Brown, C. H. Macomber, A. N. Branstad, N. P. Nelson, E. J. Wartchow, J. E. Howard and H. T. Thompson.

TRENTON, N. J.—At the annual meeting of the stockholders of the Interstate Telephone Company, the following officers and directors were elected: President, H. R. Swartz; vice president, W. S. Hancock; treasurer, C. W. Wright; secretary, Barker Gummere; general superintendent, F. A. Demarest; directors, Chas. West, L. E. Waller, John Markle, A. C. Blackwell.

MURFREESBORO, N. C.—At the annual meeting of the North State Telephone Company the following officers were re-elected: President, L. J.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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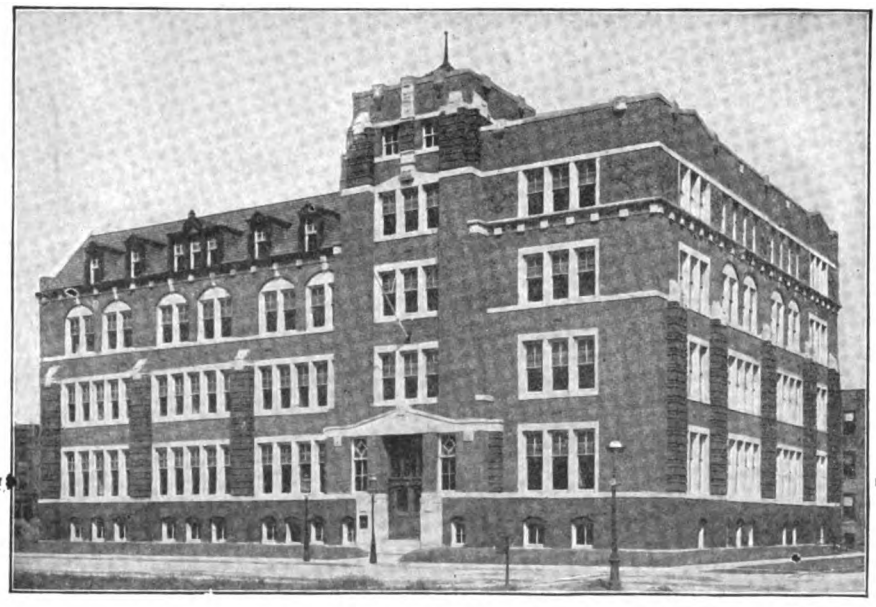

Administration Building, American School of Correspondence, Chicago.

POINTS OF SUPERIORITY
OF THE
AMERICAN SCHOOL OF CORRESPONDENCE

1. **Best Equipment** The American School of Correspondence occupies its own building—built especially for its own uses and needs. Every detail of construction has been carefully studied to provide the best possible facilities for instruction. It is the largest and best equipped building in the world devoted to correspondence instruction in Engineering exclusively. This building and equipment are in themselves a guarantee of the standing and responsibility of the school.

2. **Personal Instruction** The American School has more teachers for the number of students and a larger proportion of graduates than any other Correspondence School. These are points that determine the real value of the instruction.

3. **Chartered** The American School is chartered as an educational institution and not as a commercial enterprise established for profit. It is organized under the same laws as colleges and universities.

4. **Bound Instruction Books** The books (averaging about fifty in a course), furnished as students progress in their studies, are substantially bound in cloth, not paper pamphlets. In addition, students who enroll now in one of the full courses will get the "Reference Library of Modern Engineering Practice" in 12 volumes, 6,000 pages, without extra charge.

5. **Especially Prepared Text Books** The instruction books are especially prepared for our students by the foremost authorities. Each book bears the name of the author and is especially written and adapted for **home study.** Among the writers of the text books are: F. B. Crocker, head of Department of Electrical Engineering, Columbia University, Past President American Institute Electrical Engineers—Wm. Esty, head of Department of Electrical Engineers, Lehigh University—Frederick E. Turneaure, Dean College of Mechanics and Engineering, University of Wisconsin.

6. **College Credits** Students admitted without further examination into many colleges.

7. **Specialized Instruction** The American School is the only Correspondence School making a specialty of engineering instruction. In this age of specializing this feature must be considered.

8. **No Agents** We employ no agents. Your tuition money is paid not to agents for enrolling you, but to instructors for graduating you.

9. **No Annoyance** We send no agents to call upon you at your home or place of business. When you ask for information we send you information, not harassing solicitors.

10. **Authoritative Instruction** The instruction papers furnished to students are used as text books by many Universities and Colleges, including Universities of Michigan, Illinois, Minnesota, Iowa State College, Harvard University, Armour Institute, Lehigh University, and in the School of Submarine Defense of the U. S. Army.

11. **Best Help for You** THE AMERICAN SCHOOL OF CORRESPONDENCE is constantly fitting line men, switchboard men, instrument men, exchange installers, etc., for better positions. Our course in Telephony is the most complete taught. Telephone lines, exchanges, operation and maintenance are explained in the very clearest possible manner. Everything is up-to-date and nothing omitted. The telephone engineer will find our course of material benefit in enabling him to better fill his present position or qualify him for a better position.

12. **Best Education** The best school will give you the best education. The best education will get you the best position and the best pay. If you have ever had to look for a "job" you will appreciate the following clipping:

THE MERE MONEY VALUE OF AN EDUCATION.

The average educated man earns $1,000 per year. He works forty years making a total of $40,000 in a lifetime. The average day laborer gets $1.50 per day, 300 days in a year, or $450.00 per year. He earns $18,000 in a lifetime. The difference between $40,000 and $18,000 is $22,000. This is the minimum value of an education in mere dollars and cents. The increased self-respect cannot be measured in money.—Clipped.

AMERICAN SCHOOL of CORRESPONDENCE
CHICAGO

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American School of Correspondence

Send me 200-page hand-book describing over 60 courses. I am interested in the course marked X.

Telephone Practice	Mechanical Engineering
The Elec. Telegraph	Stationary Engineering
Electrical Engineering	Municipal Engineering
Alter. Current Work	Architectural Eng.
Central Station Work	Complete Math. Course
Electric Lighting	Coll. Prep. Course (fitting for entrance to Engineering Schools)
Electric Railways	
Civil Engineering	

Name.....

Address.....

Am. Tel. Jour., 12-7-07.

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Notes from the Field

Lawrence; vice-president, W. N. McAnge; general manager, A. E. Garrett; secretary and treasurer, Uriah Vaughan.

CONTINENTAL, O.—The following officers have been elected by the Continental Farmers' Mutual Telephone Company: President, D. S. Meyers; vice-president, G. E. Burrel; secretary and manager, C. H. Donaldson; treasurer, Frank Konst; representative, D. Jenkins.

CHIPPEWA FALLS, WIS.—The Chippewa Falls Telephone Company has elected the following officers: President, L. Richardson; vice-president, S. B. Wimmons; secretary, H. B. Bartlett; treasurer, Charles H. Lehe.

DRUMBO, ONT., CAN.—At a recent meeting of the Drumbo & Princeton Rural Telephone Company the following officers were elected: President, F. J. Daniel; vice-president, T. Conway; secretary, G. H. Smythe; treasurer, W. H. Wells.

COMBINATIONS.

CARSON CITY, NEV.—The Nevada Consolidated Telephone and Telegraph Company has purchased the property of the Alpine Telephone Company, which extended over Douglas, Alpine and Mono Counties.

MISCELLANEOUS.

DEERFIELD, WIS.—The controlling interest in the Deerfield Telephone Company, formerly owned by W. J. Bell, has been acquired by A. W. Larson and H. C. Winter, of Madison.

GENERAL CEPEDA, COAHUILA, MEXICO.—A telephone line, which is to connect a large number of ranches surrounding the town of General Cepeda, Coahuila, is being installed by the owners of the different ranches. A central office is to be established in General Cepeda.

MEXICO CITY, MEXICO.—The long distance telephone line between Toluca and the city of Mexico, which was formerly the property of the Romero Brothers, has been purchased by Juan Ochoa Ramos. The improvements planned by the new owner include the installation of a metallic circuit over the entire line and the connection of Toluca with other cities of the State.

PERSONAL.

WILLIAM ROY ADAMS, sales manager of the American Sewer Pipe Company, of Pittsburg, Pa., was married on November 27th to Miss Ethel Gertrude Eckert, of Alleghany. Mr. Adams has many friends among telephone men, who are extending their heartiest congratulations and good wishes.

A. S. KELLY has been appointed superintendent of the Nebraska Telephone Company, succeeding Mr. W. B. T. Belt, who has recently been advanced to the position of general manager.

C. E. YOST, president of the Nebraska Telephone Company, will hereafter carry on the additional duties of president of the Northwestern Telephone Exchange Company, with headquarters at Minneapolis, Minn. He takes this position upon the retirement of Mr. Pettingill from the presidency of the latter organization. It is understood that Mr. Yost will continue to reside in Omaha.

With the Builders

CONSTRUCTION.

ARBUCKLE, CAL.—The Colusa County Telephone Company, of which Charles Shadd, of Williams, is president, is extending its lines through Arbuckle. Plans are also under way for the construction of a number of additional new lines.

WASCO, CAL.—The Wasco Colony Telephone Company is constructing lines connecting Wasco with Famoso and Bakersfield.

MONTROSE, COLO.—A twenty-eight mile line between Montrose and Horsefly Valley is being constructed by Messrs. Finch and McKnight, and other extensions are now being talked of.

MONMOUTH, ILL.—The extensive improvements planned by the Independent Telephone Company of this city include, among other things, the replacement of more than fifteen blocks of fifty to one hundred pair cables with three hundred pair cables. The company's plant in the outlying parts of the city is also to be greatly enlarged.

MAJENICA, IND.—The Majenica Telephone Company, in order to take care of its new business, is constructing a new line between Majenica and Markle.

RUSHVILLE, IND.—The Rushville Co-Operative Telephone Company has expended about $49,000 in the installation of its new system.

LONG GROVE, IOWA.—The Long Grove Mutual Telephone Company is installing a new switchboard in the building which is being prepared for it. Many other changes and improvements are being made.

MUSCATINE, IOWA.—The Mississippi Valley Telephone Company expects to make a number of important changes in this city during the coming year. It is planned to erect a new office building and the lines will also be extended and the service greatly improved. In Keokuk, Ottumwa and a number of other Iowa towns, the company has made extensive improvements and Muscatine is the next city in line.

MASON CITY, IA.—A thoroughly modern telephone plant is being installed by the Mason City Independent Telephone Company at this city.

SERGENT, KY.—Among the extensions planned by the Letcher County Home Telephone Company is a line from Baker, Ky., to Potters Fork.

PALERMO, ME.—The Palermo Telephone Company is extending its lines out of Palermo in order to reach a number of rural subscribers recently obtained.

FLINT, MICH.—It is the intention of the Valley Telephone Company to rebuild its plant at Flint and Bay City, and also to build additional copper circuits between Saginaw and Flint, where connections are to be established with the Interstate Long Distance Telephone Company's new copper circuits now being constructed from Detroit to Flint.

GOLDEN CITY, MO.—The Golden City Telephone Company is considering many improvements in its system. Among these are the construction of a metallic circuit line from Lamar to Ash Grove and a line from Golden City to Joplin.

HANNIBAL, MO.—The Miller Township Telephone Company is extending and improving its system.

PRAIRIE HOME, MO.—New lines to Speed and Clarksburg are among the many improvements being considered by the Prairie Home Switchboard Company of this city.

CHESTER, N. Y.—A new switchboard has recently been installed by the Chester Telephone Company, and other extensions and improvements are to be taken up in the near future.

EAST BLOOMFIELD, N. Y.—The Ontario County Mutual Telephone Company has commenced its work of construction at Bristol Center.

BELMONT, OHIO.—The Belmont Telephone Company has completed a new line to Hunter and contemplates other extensions.

MIDDLETOWN, OHIO.—The Home Telephone Company has recently commenced the installation of a conduit system in the business portions of Middletown.

BERLIN, PA.—The Independent Telephone Company has decided on extensive additions and repairs to its system which will be consummated at once.

CHARLEROI, PA.—A new switchboard has been installed by the Charleroi Telephone Company, and it is its purpose to still further improve its plant.

NEW SHARON, PA.—The lines of the Franklin Farmers Telephone Company are being extended in this city.

PLEASANTVILLE, PA.—The lines of the Consolidated Telephone Company are being extended in Pleasantville.

SLATINGTON, PA.—The Consolidated Telephone Companies of Pennsylvania have installed a new switchboard at Slatington and will otherwise improve the system in that place.

WAYNESBURG, PA.—The exchange of the Greene County Telephone Company has recently been completed in this city.

KINGSTREE, S. C.—The Kingstree Telephone Company is constructing lines out of this city for long distance connection with adjacent towns.

STANTON, TEXAS.—A telephone system is to be installed along the lines of the railroad system which is being built between Stanton, Texas, and Amarillo by S. G. Bon Durant.

CHARLESTON, W. VA.—The Home Telephone Company, which has been making extensive repairs in its system has about completed its work and a very satisfactory service is now given. The company will make extensive additions to its system in the near future.

ALBANY, WIS.—Work on the extension of the Attica Mutual Telephone Company's lines east of Attica is in progress and it is expected that service will be given at an early date.

WEST BEND, WIS.—To take care of its greatly increased business, new lines are being erected by the Allenton Telephone Company.

DRUMBO, ONT., CAN.—The Princeton & Drumbo Rural Telephone Company is considering plans for putting exchanges in the villages of Princeton, Drumbo, Eastwood and Gobles, with possible extensions to Paris and Cathcart. These exchanges are to be connected with long distance wires. Address G. S. Smythe, secretary.

UNDERGROUND.

PEORIA, ILL.—The City Council of Peoria has recently passed an ordinance requiring all wires to be placed underground in the business portions of that city.

DES MOINES, IA.—In response to a request of the East Des Moines Commercial League, the Mutual Telephone Company has commenced the installation of an underground telephone system on the eastern side of the city.

FLINT, MICH.—The City Council of Flint has instructed the Valley Telephone Company to place all of its wires underground in the business portions of Flint.

DAYTON, OHIO.—The Board of Public Safety of this city has decided to receive bids, until December 30, 1907, for the work of placing all electric, telephone and alarm wires of the police and fire department underground.

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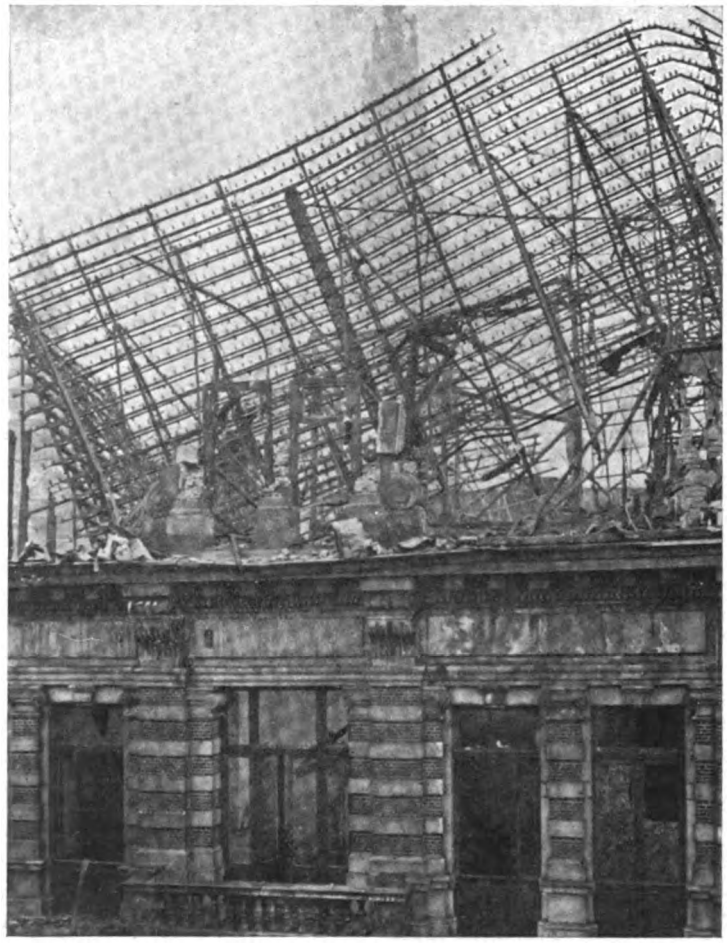
The Destruction by Fire of the Antwerp Exchange

By J. B. Van Brussel.

PEOPLE in Antwerp, Belgium, are getting along as best they can without telephone service. No connections can be made through the central office on account of its recent destruction by fire. The outbreak occurred somewhat past midnight, so that there was no panic to employees, as only a few operators were on duty, but the flames had taken good hold before the fire brigade could get to work on them. Not only have the upper floors of the building been practically "gutted," but the roof and the top floor, on which was the switchroom, have actually fallen in. The ground floor, which is occupied by a large store, was not burnt out, although much damaged. The rest of the building is quite useless, and its contents have been almost entirely consumed.



View of the Upper Part of the Government Telephone Exchange Building at Antwerp, After the Extinction of the Fire.

From the engineering point of view the loss of the equipment in this exchange is not a very important one, for Antwerp possessed one of the oldest telephone exchanges, employing some of the most antiquated equipment in Europe. It dated back to 1887, and it was on the series multiple system, with hand-restored indicators, while out of the 4,400 subscribers' lines, only about 200 had metallic circuits. There was only the single central office which was burned to serve the entire city.

A new exchange had been in course of erection for about five years, and the building itself has been completed for some three years. The equipment of this new exchange had, however, been from time to time postponed, and was to have been taken in hand at the beginning of next spring.

The equipment in this new exchange will be of the common battery type, and its initial capacity will be 7,300 subscribers' lines. The flat rate subscribers' positions will be arranged for 160 subscribers per operator, and the measured rate positions for 300 subscribers per operator. Unless the original plans are now changed, the whole city will be served by this exchange, so that no provision of trunk positions will be necessary, but, of course, there will be a board for the toll or long-distance lines. Each operator's keyboard will have eighteen cord circuits, but there will not be party-line ringing keys on each pair of cords, but simply a 4-party line master key on each position. Single-pulley cords are to be used, for there will be a false floor over the whole switchroom, leaving a space about a metre high for the cables, etc., and the cords and their weights will be led through slots in this floor. The length and breadth of the switchroom will be about 39 and 20 metres respectively, so that it is seen that there will be plenty of room for extension.

The apparatus-room is about the same length as the switchroom, but only 13.6 metres wide, as the remainder of the space on this floor is devoted to the operators' cloak-rooms, dining-room, retiring-rooms, etc. A space of about 6 x 8.7 metres at one corner of the room will also be partitioned off for the batteries.

The motor-generators and their switchboard will be at the same end as the battery-room, and the cable-heads will be at the opposite end. In addition to the main and intermediate distributing frames, the apparatus-room will contain the relay, meter and condenser racks, etc. The other floors of the new building will be utilized for offices.

All the lines in the city will gradually be placed underground, and the single wire working will be superseded as rapidly as possible.

It is not feasible, of course, to delay the resumption of traffic until the new exchange has been equipped, but a corridor in the

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new building will be utilized in which to erect part of the new board in a temporary manner. The first step to be taken, however, was to clear the trunk wires as quickly as possible, and connect them directly to the Bourse. Foundations are also being dug so that a temporary framework may be erected close to what is left of the old building, and on this the wires will be taken off to relieve the stress on the fallen wire supporting framework and the top of the ruins. This is obviously necessary, as there have already been some heavy falls of stone from the top of the building, and moreover, if the wire tower were to fall over further, it would doubtless pull down some of the fairly large roof standards on adjoining buildings.

In making the temporary exchange arrangements, the apparatus room will be equipped, as far as possible, as it will be for permanent working, but the subscribers' switchboard will not be placed in its permanent quarters. A standard main frame will be employed and standard common battery switchboard equipment modified to meet the fact that the lines are single-wire and not metallic circuit. Even the 200 metallic circuit lines will probably not be employed as metallic circuits, for it has been proposed to divide these up into single lines so as to hasten the re-establishment of the circuits. The line and cut-off relays will be rewired for magneto calling, but lamp line signals will be employed. For the clearing-out signal, however, series drop indicator will be used. The temporary switchboard will only be wired for single lines.

Rules for Operating Room Employees

A Complete Set of Instructions and Rules for the Government of Local Operating Room Employees.

COMPILED BY KENDALL WEISIGER.

THE handling of a connection at the subscribers' switchboard up to the closing of the listening key after the insertion of the calling plug was covered in the preceding installment of this article. Succeeding instructions relate to the operations necessary to complete the connection by bringing the desired subscriber to the telephone, and are stated as follows:

Ringing the Subscriber.—(a.) Ring the subscriber by steadily operating the proper ringing key for a period of two seconds, or as long as it takes to rapidly count ten. Spasmodic or jerky ringing does not properly ring the subscriber's bell, and is, therefore, prohibited.

¶Exceedingly long rings are also to be avoided, especially where grounded two-party line systems are used, for the reason that if the called party removes his receiver before the end of the ring it will cause the bell of the corresponding party whose bell is attached to the other wire of the line to ring also.

(b.) If, at the end of approximately thirty seconds, the subscriber has not answered, say to the calling subscriber, *"I am ringing Main four five six"* and ring again. Before ringing, give the calling subscriber opportunity to inform you in case he should not want the party called again.

¶The matter of following up connections to completion is of paramount importance and the presence of this feature is one of the surest evidences of general good service. The subscriber is willing to wait on the connection if he is assured that the operator is making an effort to secure the desired answer.

(c.) If, at the end of a reasonable time, you are still unable to raise the called subscriber, say to the calling subscriber, *"Main four five six don't answer,"* and be governed by the wishes of the calling subscriber, who may ask you to ring again, or for another number.

¶In offices operating on the message rate basis it is desirable to complete all possible connections, and in such offices it is the practice to continue ringing the called subscriber for as long as five minutes. In offices operating flat rate lines it puts an unnecessary load on the operator to prolong the ringing and it is felt that two positive rings should result, in most cases, in bringing the party to the telephone.

(d.) In following up calls which are being handled by a distant "B" operator, when the operator has forgotten the number called the expressions, *"I'm ringing them,"* and *"They don't answer"* may be substituted respectively for the standard expressions, *"I'm ringing Main four, five, six,"* and *"Main four, five, six don't answer."*

Following Up Connections.—The matter of following up connections to completion is of the greatest importance, and, if properly handled, will reduce the necessity for answering second signals to a minimum.

Supervision of Calls to "Desks," Long Distance, Etc.—As subscribers generally want a second connection after a connection with the information desk, and as desk trunks and long distance trunks should not be tied up unnecessarily, operators must pay particular attention to the supervision of these calls in order to give quick answers to recalls, and to make quick disconnections.

COMPLETING A TRUNK CONNECTION.

If the call is for a line that does not appear before the "A" operator, it will be handled as follows:

Ring-down Trunk Calls.—(a). Take up the front plug of the pair selected while repeating the number for check, and carry it toward the group of trunks that terminates in the desired office.

(b). Beginning with the nearest one of the group of trunk jacks, test each jack in the group successively until an idle jack is found.

(c). Insert the plug and ring for a period of one second, or as long as it takes to rapidly count five.

(d). While ringing the distant office, pull the back plug far enough out of the jack to prevent the calling subscriber from hearing the passing of the call to the distant operator, again pushing it in after the call has been passed. The distant operator will answer by giving the name of the office; if she does not answer within five seconds, the ring may be repeated twice at five second intervals. If, at the end of fifteen seconds, no answer has been received, hold the trunk and ring on another trunk, requesting the distant operator to answer the call on the trunk first selected.

(e). If no direct trunk is idle, the operator must try to complete the connection through some other office if possible, before reporting *"All the trunk lines to (Name) office are in use."* Whenever this report is given, the fact should be reported to the Supervisor.

¶A "Ring-down" trunk is a trunk which terminates at a jack associated either with a magneto drop or a relay designed to be operated by ringing current. It is necessary to ring on such a trunk in order to signal the distant office; call or "order wire" circuits are not used in connection with trunks of this class, the order being passed over the trunk itself. Ring-down trunks are used to comparatively small offices, where the amount of trunking is insufficient to justify the use of a pair of wires for the sole purpose of transmitting instructions between operators.

¶In large multi-office districts such a condition as will prevent forwarding a call over a direct wire, without switching through an intermediate exchange, should rarely exist; when it does exist it is a matter of a short time until a traffic study can be made and additional trunks provided if necessary. There are a number of medium sized offices, however, having one or two small offices

EDITOR'S NOTE.—This is an actual set of working instructions for a traffic department. Supplementary notes inserted for the information of telephone men who are not operating experts, or to explain doubtful points, but not properly included in the actual working copy, are contained in paragraphs preceded by the sign (¶). Begun in the issue of November 16.

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located at a considerable distance to which free service is given. As the comparative cost of circuits to such offices is high, in many cases, and as the traffic fluctuates over a larger range there will be many times when all the trunks are busy. In such communities the public seem to understand the situation, and are satisfied to accept the report of "All the lines are busy."

Answering Incoming Ring-Down Trunk Calls.—A ring-down trunk call is handled the same as a subscriber's call, except that the operator will answer it by giving the name of her office, instead of answering "Number."

(*To be Continued.*)

THE EFFECT UPON NEIGHBORING TELEPHONE WIRES OF THE GROUNDED NEUTRAL ON TRANSMISSION LINES.

AT the meeting of the Pittsburg branch of the American Institute of Electrical Engineers, held on November 6, a paper on "The Grounded Neutral" was read by Mr. P. M. Lincoln. In the ensuing discussion some interesting features of the problems involved, from the standpoint of a telephone company, were brought out by Mr. E. B. Tuttle. He said:

"The subject of induction is, of course, an important one between the telephone engineer and the power engineer. Especially since the single-phase trolley lines have been put in operation, telephone engineers have had voluminous discussions and have done considerable investigating.

"I wish to speak to-night simply in reference to the three-phase line with the grounded neutral, with or without ground resistance. I have taken as a possible case a three-phase transmission line 40 feet above the ground, with five foot spacing, and a telephone line, say on the opposite side of the highway, a distance of 40 feet, the telephone line placed a distance of 30 feet from the ground and the wires, say, one foot apart, and have considered the case of a No. 12 N.B.S. telephone circuit.

"It has been brought out quite plainly that in the case of the transmission line being without neutral ground, the induction is not at all considerable under normal working conditions, the potential of the three lines being maintained through the capacity to ground. I find that in considering a 60,000 volt transmission line the induction per mile on a telephone circuit, under those conditions, will be about four-tenths (.4) of a micro-ampere flowing from one side to the other. I might state that the telephone company has looked into the question, determining if possible the amount of current which can be flowing through the subscriber's receiver without any objection being raised on his part, and this has been determined to be not over 15 or 20 micro-amperes.

"In case the neutral is grounded we immediately have the conditions which were described by Dr. Steinmetz in his discussion at New York on September 28th, last year, in which he stated that there immediately appears, if the neutral is grounded at one end of the transmission line only, the triple harmonic in all of the three circuits of the star-connected transformer, and these three being in phase, will in some cases amount to as much as one-half of the total potential between the lines. Thus, in the case of a 60,000 volt line we would have a triple harmonic which would have a potential somewhere in the neighborhood of 30,000 volts and with the neutral grounded this would vary the entire system of the lines up and down from negative to positive through a range of 30,000 volts. This produces in the telephone line 9 micro-amperes of current, which is not a very formidable amount. With a 20,000 volt circuit, such as is used to a considerable extent in the neighborhood of Pittsburg, we would get 3 micro-amperes of current.

Now in case the neutrals at both ends of the line are grounded this voltage is immediately destroyed unless the grounds are of high resistance. The triple harmonic disappears and there comes in place a current of triple frequency flowing through the three lines in parallel, which is approximately one-third of the magnetizing current of the transformer, and since the magnetizing current is not over 5 per cent. and the triple harmonic current being about one-third of this, we get approximately 2 per cent. Taking the case of the Ontario traction line where 30,000 horsepower is being transmitted, this would give us somewhere in the neighborhood of 2 or 4 amperes flowing in the three circuits in parallel. This gives a value of .45 and .9 micro-volts across the line, respectively.

"I did not calculate the induction with no neutrals grounded, but with one neutral grounded a triple harmonic gives us 66 micro-amperes for 10 feet separation; and with both neutrals grounded, about 2.5 volts. This, of course, is the current or voltage induced per mile in every case, and I have taken the mile as a reference length from the fact that for cross-talk purposes telephone lines have to be transposed about once a mile.

In the case of a 20,000 volt line the values would be one-third as great. While telephone lines are never built within ten feet of a 60,000 volt transmission line, it quite frequently occurs that 20,000 volt transmission lines are built within ten feet of telephone lines, and in that case the effect is approximately ten times as great as in the case of 40 feet separation.

A much more difficult proposition arises from the question of insulation. A very good, well-insulated telephone has about ten megohms per mile of insulation. We will take a condition of no grounded neutrals and suppose that one side of a circuit becomes grounded. We will then get static potential sufficient on the telephone lines to cause a flow of 876 micro-amperes to ground through ten megohms of resistance at a separation of 40 feet. As is quite frequently the case, suppose that one side of the line has an insulation of ten megohms and the other side of the line may have a much higher insulation; in one particular case I remember, 34 megohms. In that case we would get 33 micro-amperes of current flowing from one side of the line to the other per mile, and it should be remembered that this is not affected by transpositions. This difficulty multiplies by the number of miles. Under the same conditions, if one neutral is grounded we would get 2,206 micro-amperes due to the triple harmonic to ground through the 10 megohms, and we would get 331 micro-amperes per mile across the pair if the insulation of the two sides of the telephone had 10 and 34 megohms insulation, respectively.

We will take another condition which frequently occurs. Suppose the insulation of one side of the line drops to one megohm. It is still a good commercial circuit and can be used without any difficulty under favorable circumstances. In this case we would get across the pair at one end with the third harmonic with one grounded neutral, 686 micro-amperes with 40 feet separation.

The other condition which we must consider is the abnormal condition which occurs with two grounded neutrals when one line is out of service. In this case a current flows through the neutral to ground about 1.73 times as great as the current in the line. Suppose that were 100 amperes; in that case there would be 1.8 volts per mile electro-magnetic induction between the two sides of the telephone circuit. This is prohibitive to the use of the line for telephone service. In the case of a line 10 feet away the induction would be 14 volts.

"These are points which show some of the results with a grounded neutral, and in the above abnormal condition, there would be practically a single-phase transmission system with ground return and even worse, because there are no rails to carry the return current. In the case of the single-phase line the rail return is sufficiently close to assist materially in overcoming the induction due to the trolley current."

WASHINGTON WHEAT BELT TO BE DEVELOPED BY INDEPENDENTS.

THE working out of plans now under consideration means that Dayton, Wash., and the wheat belt in the Walla Walla district, southwest of Spokane, will be part of the system which the Independent Telephone Company is organizing throughout the Pacific northwest. The movement is supported by the Dayton Commercial Club and many of the prominent business men of the city. J. E. McGillivray, a representa-

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tive of the Independent interests, and W. J. Brownell will organize a stock company to install the plant, which will have connections with Walla Walla, Wash., and the surrounding towns in the district.

UNPREJUDICED INVESTIGATION JUSTIFIES THE TELEPHONE COMPANY AT OLATHE, KAS., IN RAISING RATES.

THAT there might be a better understanding of real conditions, the justice or injustice of the demands, and that the patrons of the company might know the facts, and not be prejudiced by surmises in relation to the advancing of rates for service by the Citizens Telephone Company, the Olathe Commercial Club of Olathe, Kas., appointed a committee of five business and professional men to examine the books of the company and to compare its rates and the service given with those of other cities.

The committee has accordingly made an investigation, and has reported that, after thorough investigation, it finds that the service given by the Citizens Telephone Company is much superior to that furnished by companies of equal size in the adjacent territory, and the company in continuing to operate under the present rates and provide a proper reserve for depreciation would have each year a substantial deficit. Therefore the committee finds that the company is justified in increasing its rates to those specified in the announcement of the company, which will allow the company to operate its system at a fair profit instead of a loss.

How to Make and Install a Repeating Coil*

By Harvey Flint.

THE operation of winding the wire on the spool constructed as described in the first part of this article is shown in Fig. 4. No. 32 silk covered wire is used. This is the size usually used on the 5 bar generator armatures. The exact size is of little consequence, however. The winding begins at terminal No. 1. Run on 1,400 turns, and bring the end out at No. 2. Then cover with two turns of writing paper. The layers should be smooth and firm. The next winding begins at No. 3 and terminates at No. 4.

Continue until four windings are put on, each winding consisting of 1,400 turns of wire, with the two layers of paper between each winding. A good way to count the turns is to count the turns on one layer, then put on the proper number of layers. The wires should be wound on evenly in layers, and should be free from kinks or splices, unless the splices are soldered and well wrapped.

When the coil is completed, the outside layer of wire should be covered with a couple of layers of paper, and the center tube should be filled with as many fine iron wires as it is possible to jack into it. The fine wires from an old induction coil core will answer. Next an ordinary tin can of sufficient size to contain the complete coil should be taken. The bottom should be drilled with holes large enough to allow the coil terminals to project without touching the tin.

A piece of paper should be pasted over each end of the core, so that it will not touch the tin can, and the coil should be placed inside the can and fastened by two screws, as shown in Fig. 5. Then, if it is desired to protect the coil from dampness, the can should be filled with melted paraffine or beeswax, and the lid soldered on.

Coils mounted in this fashion can be placed side by side in the switchboard without danger of cross-talk. When only one coil is to be made, the shell can be omitted entirely.

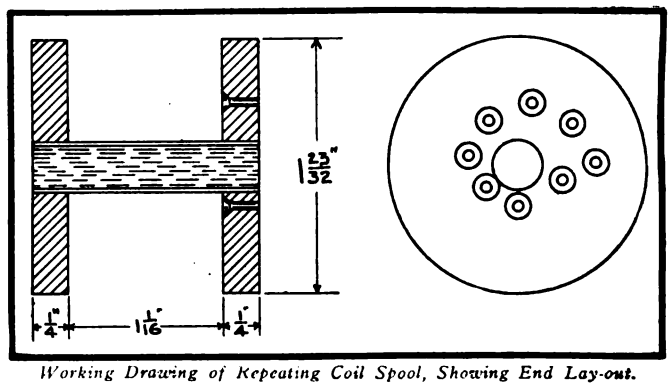
*Concluded from the issue of Dec. 7.

By turning up two iron heads with shoulders to fit inside the iron tube and using two brass bolts to hold heads on tubes, and hold the coil firmly in place, a very satisfactory and convenient means of mounting the coils is provided. This feature is not found in most ready-made coils, which are usually riveted together in such a manner that it is necessary to almost destroy the shell to get them apart.

The next thing is to connect the coil in the cord circuit of the switchboard, so that it can be used to connect any two lines.

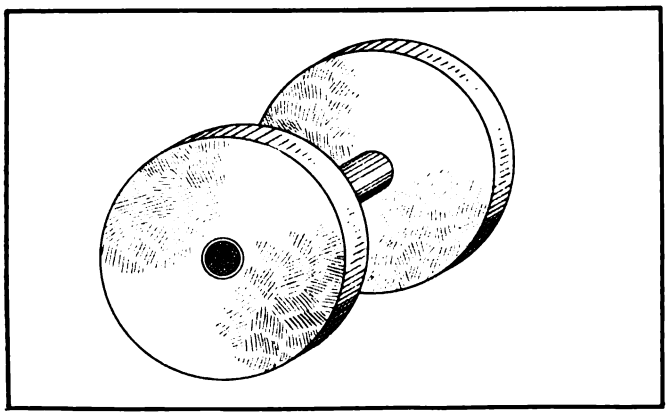
Fig. 6 shows a circuit which can be applied to any switchboard without changing the existing equipment to any great extent.

Connect the terminals of one cord directly to terminals 1 and 8 of the coil. If the switchboard is equipped to ring with one plug only, connect the cord you do *not* ring with as above. Also



Working Drawing of Repeating Coil Spool, Showing End Lay-out.

connect the clearing out drop to terminals 1 and 8. Terminals 2 and 7 of the coil are connected to a ½ M. F. condenser, which will prevent the passage of ringing currents through the coil,



Spool for Repeating Coil, Completed.

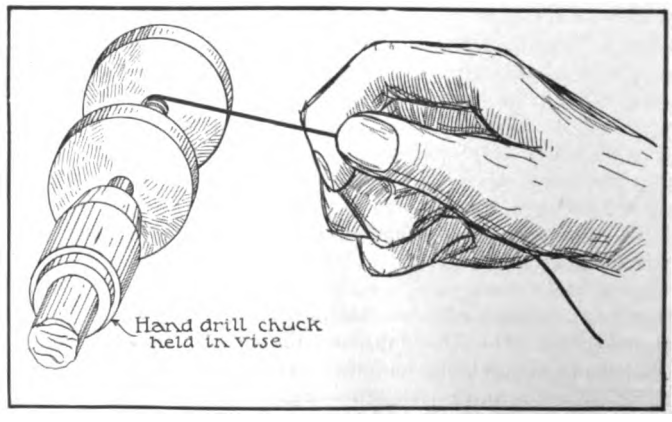


Fig. 4. Winding the repeating coil.

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thereby securing the operation of the clearing out drops. Terminals 4 and 5 should be connected together. Terminals 3 and 6 should be connected to the terminals in the switchboard from which the cord connected to 1 and 8 on the coil were taken.

It will be noticed that the clearing out drop will not fall when one of the parties connected rings off. When the party connected by means of the cord wires to terminals 1 and 8 of the coil rings off, the drop will fall, as the condenser opens the repeating coil circuit so far as ringing current is concerned, while it offers no opposition to the passage of voice currents. The condenser can be omitted when it is not necessary to secure the clearing out signal.

The resistance of the windings of the coil here described are about as follows. Of course a difference in the size wire, method of winding, etc., will make some change.

1st	winding, or one next to core	40	Ohms.
2nd	"	60	"
3rd	"	75	"
4th	"	95	"

As the 1st and 4th windings are in series when connected, their resistance is about 135 ohms.

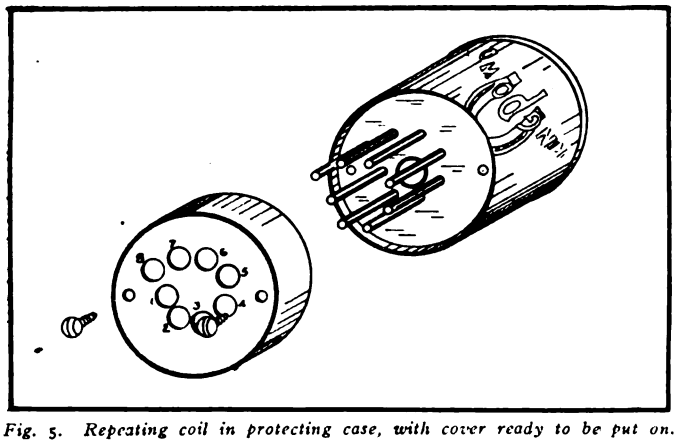

Fig. 5. Repeating coil in protecting case, with cover ready to be put on.

The 2nd and 3rd windings are also in series, so that they measure 135 ohms.

Each half of the coil consists of 2,800 turns, so that transmission is equally good both ways.

Placing the coil in the cord circuit will not interfere with using the cord for regular service, as it would require an expert to determine the difference between a cord circuit equipped with a coil of this type, and one without it.

REPORTS OF GOOD BUSINESS MADE BY INDEPENDENT COMPANY AT FORT WAYNE.

STOCKHOLDERS of the Home Telephone & Telegraph Company, at Fort Wayne, Ind., learned from the report of Secretary W. L. Moellering at a recent meeting that a gain of 560 new subscribers has been made during the past year. It was stated that the gross and net receipts are by far the best in the history of the company. Six per cent. is now paid on the common stock. During the year a 25 per cent. increase in long distance business has occurred, and at the present time the rate of growth in this class of service is even larger. Switchboard extensions have been made within the past twelve months, and

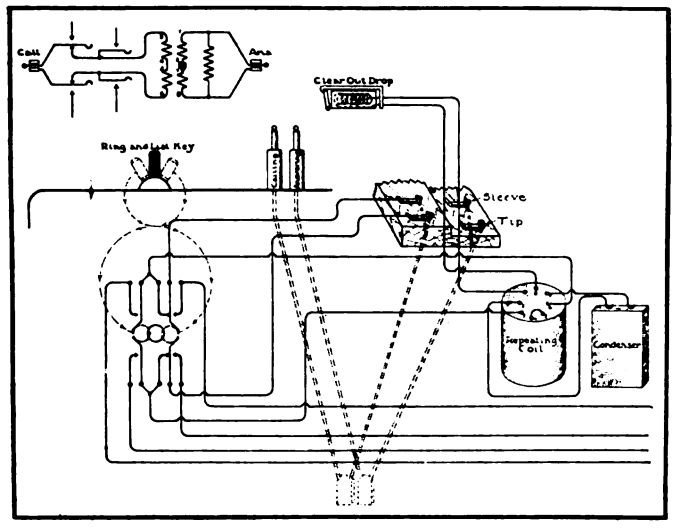

Fig. 6. Arrangement of wiring of repeating coil in magneto switchboard cord circuit.

it is expected that considerable cable will be installed both underground and in the air before long. One of the reasons for the strength of this company is that 95 per cent. of its stock is held by local people, of whom there are 250 interested.

SHRINKAGE OF WOOD WHEN DRIED.

INTERESTING experiments on the shrinkage of wood due to the loss of moisture have recently been completed by the Forest Service at its timber testing station at Yale University. These experiments show that green wood does not shrink at all in drying until the amount of moisture in it has been reduced to about one-third of the dry weight of the wood. From this point on to the absolutely dry condition, the shrinkage in the area of cross-section of the wood is directly proportional to the amount of moisture removed.

The shrinkage of wood in a direction parallel to the grain is very small; so small in comparison with the shrinkage at right angles to the grain that, in computing the total shrinkage in volume, the longitudinal shrinkage may be neglected entirely.

The volumetric shrinkage varies with different woods, being about 26 per cent. of the dry volume for the species of eucalyptus known as blue gum, and only about 7 per cent. for red cedar. For hickory, the shrinkage is about 20 per cent. of the dry volume, and for longleaf pine about 15 per cent.

In the usual air dry condition, from 12 to 15 per cent. of moisture still remains in the wood, so that the shrinkage from the green condition to the air dry condition is only a trifle over half of that from the green to the absolutely dry state.

Unprofitable Business*

By Thos. O'Rourke.

NOTHING is more demoralizing than credit competition. Collection for rentals and tolls should not be let run from month to month. Managers who have such accounts on their books should get after them and see that they are all paid in full. In the telephone business there should be no credit. No collector should accept the toll and not the rent; the right thing is to either collect all of the account or none at all. Telephone companies cannot stand with their books charged in large amounts against their customers, because if times are at all bad trouble with bad debts begins. The subscriber leans more and more heavily on the company granting credit, and his account becomes more and more difficult to collect as times goes on. Bad debts have sent many a good business firm to the wall.

Telephone bills, not only in the city but in the country, should be paid quarterly in advance and no part payments should be accepted by the telephone company. Telephones are a great deal better in the stock room than out in somebody's residence or business where the company is not receiving a cent for them.

*Abstract from an address by Mr. O Rourke, general manager of the Delaware & Madison County Telephone Company, Muncie, Ind., at a meeting of the fifth district, Indiana Independent Telephone Association.

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Some managers like to have a large list of telephones and do not watch the collections closely enough. It is better, however, to have good subscribers and get the money for those connected than to have a large list with a big proportion of persons whose credit is poor. Let the poor ones go or give them to the Bell company!

Most of the Independent telephone companies realize that collections must be made. No investor wants their stocks or bonds if they are going to let everybody have service without looking to see who the parties are, and what their responsibility is. It is not the best plan nowadays to put telephones in for new subscribers for six months. No company can afford to take a subscriber in that way—the profitable thing is to make them sign contracts for a year and see that their contract is fulfilled and also carry out the other part of the contract by giving good service.

Cheap Labor.

One consequence of the rapid growth of the telephone companies has been that in some instances workmen wholly unfit have been hired to do work that only skilled men should attempt. It would be hard to tell just how many thousand dollars have been lost because of improper attention to this matter, not only by the Independent but by the Bell telephone companies. It has been so that anybody who could climb a pole or install electric door bells considered himself an expert, and telephone managers have all had some of these kind of men. A great many companies suffer from incompetent men, and most especially by not having at the head of construction gangs men who know good work from bad.

Of course there will always be inefficient help in any line of business. This is due to the unfortunate fact that those who invest know altogether too little about the practical end of the business, and have to take the word of some one else who claims to know. An employee who never reads a telephone journal or book, and fails to study his business will never be of any great service to the company that hires him.

Free Exchange.

There is plenty of toll business, but there is too much of it on the basis of the free and unlimited coinage of speech at the rate of sixteen telephones to one wire, and that wire the connecting trunk between two exchanges. It is not difficult to convince the managers of mutual exchanges that free exchange of toll calls between themselves and neighboring exchanges is unfair. Free toll connections, it is readily admitted, encourage the use of toll circuits for nonsensical messages—the handling of which costs many times more than they are worth. In large cities the deadhead call has become such a nuisance that it is used as a serious argument by the proprietors of many stores against installing telephones at all. This is always the case in a railway station and public places where unlimited service is used. In small towns, where people are more familiar with their neighbors, it is even more of a nuisance in this respect. When pay stations are not installed in public places it is always a losing proposition for the telephone company as well as the party in whose business establishment the telephone is placed. Another thing—where toll operators do not watch the time on toll tickets, they not only lose for the company, but demoralize the business.

Unstable Construction.

The days of poleless and wireless telephony are not here just yet. Those who try to use that form of construction by separating a fence wire from mother earth with a fifteen foot oak pole will have to rebuild the entire system before it will be voted a success by the telephone public. The tinware switchboards and barb wire pole lines are very unprofitable, not only to the subscriber, but to the management.

It is frequently a difficult matter for the most experienced engineer to select material that will be the best for the telephone company. A prospective investor in a railroad about to be built would be considered erratic if he proposed to construct it without first consulting a competent engineer, yet this is what is being done every day by telephone companies. Many rural lines and city lines have been put up so that only a short time afterwards there have begun to crop out defects in their construction and operation which have necessitated an expenditure that, added to the original cost, far exceeds the amount which would have been required at the outset had a thorough investigation of the requirements of construction been undertaken. The question of the pole line construction is only one part of the telephone business which meets with too little consideration. Service distribution is another feature of line construction which causes no end of trouble and expense. Another mistaken idea has grown up among city and country subscribers, but mostly in the country. It is that telephone lines can be built and maintained and service furnished almost free of cost. Experiments in the telephone business have as a rule proven very costly, and it is folly for the Independent telephone companies to experiment with something at the public or their own expense without making a careful study in advance.

In the writer's judgment, among other things, it is most important to carefully guard collecting; to see that help is of the highest character possible to obtain; to see to it that all construction work is of the highest standard; and with proper management and economy the service will force satisfaction upon the patrons, and create a confidence that will bring the telephone business to the front and create for its bonds and stocks a ready market, which is most essential to the prosperity of every enterprise.

EXCELLENT REASONS FOR INCREASE OF RATES ADVANCED BY INDEPENDENT TELEPHONE COMPANY AT ROCHESTER, NEW YORK.

IN a circular recently sent to subscribers of the Rochester Telephone Company by the president, Geo. R. Fuller, a very clear statement of facts shows why the company is justified in increasing its present schedule of rates for service. Among the most interesting and forcible paragraphs are the following, selected from a two page printed circular:

"The company believes that an increase of fifty per cent. in each of the rates heretofore charged by it, would be entirely justified. The present rates were fixed, as stated in the announcement recently made, for a system of three thousand telephones. The system now has over ten thousand telephones in service, and the value of the service is therefore at least doubled to every patron. When the system did not exceed three thousand telephones, the average calls, per telephone, were six per day. Now, with a system of somewhat above ten thousand telephones, the average calls per telephone per day are fourteen. The doubling of the number of calls per telephone per day adds greatly to the expense of handling the business. This one feature of the extra value of the telephone service, at the present time, because of the growth of the system, is, of itself, a complete justification for a fifty per cent. increase in the rates.

"In addition to this statement we want to give figures from our books as to the increase in the cost of materials and operation. Underground cable, the size carrying 200 pairs of wires, was bought by us in 1902 for 60 cents per foot, but to-day we have to pay 98.6 cents for the same thing. Interior wire for which we paid $5.75 per 1,000 feet five years ago, is to-day selling at $9.79 and steel wire that was worth 3⅜ cents per foot, is worth 4½ cents per foot now. Poles that cost from $1.60 to $6.42 each five years ago find a ready market to-day at from $3 to $13.15 each, while cross-arms that sold for 29 cents each in 1902 are to-day selling at 47½ cents. These are the supplies and materials that go largely to make up the maintenance expense of a telephone company, and there has been a corresponding increase in the cost of all other equipment.

"As for labor, linemen who received $2.25 per ten-hour day five years ago are now receiving $2.75 per nine-hour day, operators who then received an average of $5.75 per week now average $7.60 per week, and the increase in the pay of clerks and assistants has been fully 25 per cent. These are matters that anybody can understand, and they tell their own story."

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How and Why

SIZE OF WIRE FOR TOLL LINE.—(952.)

Can you give me information about the methods employed in the United States to determine the proper size of wire to be used for toll lines? The specific case I have in mind is this: Given two exchanges of about 1000, standard construction, series magneto telephones in each, the local wire plants consisting of open wire lines with a small amount of aerial cable. What size of iron wire B B should be employed in a metallic circuit standard construction toll line with transpositions to secure satisfactory transmission between these two exchanges, which are 275 miles apart?

W. I. L., Mexico.

TO determine the proper size of conductor to use for a trunk or long distance connection between two points, the proper method of procedure is to first determine or estimate the losses in efficiency of transmission which will occur in the terminating and connecting apparatus. This terminal loss is subtracted from the maximum allowable total loss and the remainder is the allowable loss in the line proper. This being established, it is possible to select the size and character of conductor which, for the stated distance, will give the nearest to the desired efficiency, making allowance for possible contingencies which cannot be definitely foreseen. This selection will be modified by considerations of commercial sizes, climatic conditions which may forbid the use of certain materials by corrosion, or which may introduce, through dampness, an unusually large leakage loss, and special considerations of cost or expediency. Allowance should also be made for the losses in possible extension lines to be connected to the ends of the present lines, if any are contemplated, and for special apparatus, such as simplex or phantom coils, or intermediate stations which may be introduced in the circuit.

The standard usually employed in expressing efficiency of transmission is the equivalent in miles of No. 19 American wire gauge paper insulated, lead covered cable with a capacity per pair of 0.06 microfarads per mile. A mile of this standard cable added to any circuit produces a loss of about four per cent. That is, a mile of No. 19 standard cable, or its equivalent, added to a circuit whose efficiency is 80 per cent., produces an additional loss of 4 per cent. of 80 per cent., or 3.2 per cent.; added to a circuit whose efficiency is 30 per cent., it makes an additional loss of 4 per cent. of 30 per cent., or 1.2 per cent. Efficiency as used here means the ratio of volume of transmission to that obtained over a circuit of length zero.

It is found by experiment that an easy commercial conversation is impossible under average conditions over a circuit whose

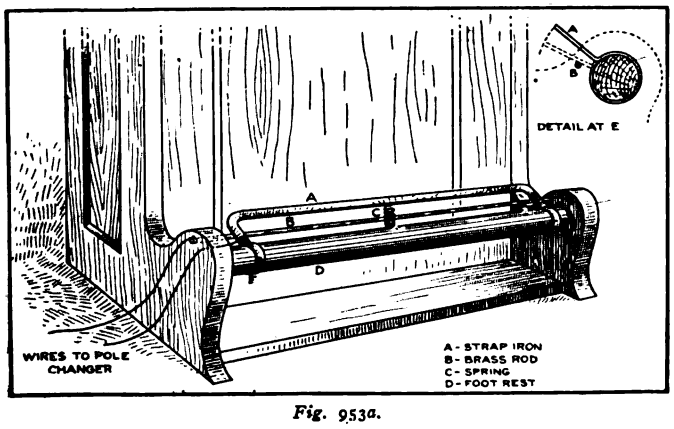

Fig. 953a.

equivalent loss exceeds 32 miles of standard cable; that is, about 27 per cent. efficiency.

Coming definitely to the two exchanges mentioned in your question, it is fair and conservative to assume an average maximum loss at each end of one mile of standard No. 19 cable for the switchboard and connecting apparatus and one mile for a subscriber's loop. This gives a total fixed loss of four miles.

This leaves 28 miles equivalent for the line proper. Of this four miles may be allowed as a margin of safety against contingencies. Twenty-four miles of No. 19 standard cable, then, is the amount to which this line should be equivalent.

It has been shown experimentally that 275 miles of copper wire, No. 12, new British standard gauge, is equivalent to 21 miles of standard No. 19 cable. Its resistance is 10.5 ohms per loop mile.

The largest iron wire which can be handled conveniently is No. 6 Birmingham wire gauge. Its resistance is 17 ohms per loop mile. Its capacity and leakage, due to its large surface,

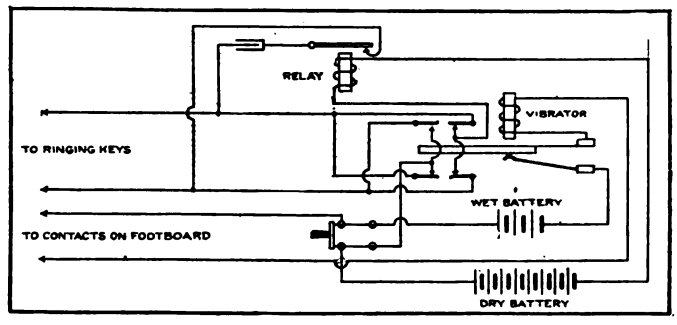

Fig. 953b.

are so large as to render it impracticable for long telephone circuits. Its self-inductance is also a serious factor.

No. 8 B. W. G. iron wire has a resistance of 26 ohms per loop mile, as compared with 10.5 ohms for No. 12 N. B. S. copper; 275 miles of No. 8 iron is equivalent to about 50 miles of standard No. 19 cable.

It is therefore evident that iron is not to be considered for a line of this length. In fact, the largest iron in practical use in this country to any extent is No. 12 B. W. G. This is used on lines not exceeding 35 to 50 miles for damp districts, and 75 to 100 miles for dry country, and then only on less important long distance lines where there is little or no long haul traffic.

No. 12 N. B. S., or No. 10 American or Browne & Sharpe wire gauge, which are nearly the same, is the standard for long distance telephone lines from 50 to 350 miles in length. This wire is of hard drawn copper, is much stronger in proportion to its weight and area, and therefore more substantial, has a much longer life and a very much greater junk value than iron. It costs about twice as much as No. 8 iron, but will pay the difference in the long run. It is a standard size of wire, and is used in so large quantities that it can be obtained with very little delay.

We would therefore recommend No. 12 N. B. S. (or No. 10 B. & S.) gauge hard drawn copper wire in your case.

SAVING WARNER POLE CHANGER BATTERY.—(953.)

We have a Warner pole changer for ringing, and find that a full renewal for type R. R. cells lasts us only about ninety to one hundred days, and, of course, very satisfactory service is not secured during the last of this period. Why can't we cut a relay into the line, and save a lot of this current that is wasted by the vibrator running continuously? Please let us know, and also the resistance for the relay. C. S. J., Iowa.

WE do not quite understand your idea in relation to inserting a relay in the line for saving the current that you state is wasted by the vibrator running continuously. The writer has in mind, however, an exchange in which a very simple plan was used for opening the vibrator circuit during such times as the operator was not calling some subscriber. In the exchange mentioned a strap of iron, bent as shown in Fig. 953*a*, was attached to the foot rail on the switchboard, and held up by a spring. A brass rod was also inserted in the foot rest retaining pieces of the switchboard, as shown, so that when the operator desired to ring she pressed the strap of iron with her foot, thus making contact between the iron and the brass rod, which were in series with the vibrator and battery of the pole changer. The circuit arrangement of the pole changer and connections to switchboard are shown in Fig. 953*b*.

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As Things Look to the Editor

THE TOLL OPERATOR'S RELATION TO NEW INVESTMENTS.

IT may be a good thing that some companies have found it advisable, on account of external conditions, to slightly postpone the building of new lines. Investigation has recently brought to light numerous cases, for example, where toll line facilities supposed to be working to the limit of their capacity were not carrying by any means as much profitable business as they should. They may have been almost constantly in use as mediums for the transmission of speech, but this is an altogether different thing from the forwarding of business. The fault has, sad to say, been found to rest rather close to the toll line operators in many such cases. Some of the girls who are overenthusiastic about treating the subscribers in their own exchanges as well as possible are likely to lose their sense of proportion. They try to get in ahead of everybody else every time. This makes the other girls who use the same wire, and have not a finely developed ability at discrimination, suspect that the ambitious ones are nothing more nor less than selfish. This, in turn, leads to the use of the long distance and trunk wires for much talk not set down in the code—coaxing, complaint, and, alas! too often something that seems to be downright unhappy wrangling.

When such conditions as these reach a certain stage, in any exchange, they come in for the close attention of the chief operator. She sees that discipline is falling off, and that her subordinates are not working smoothly with the operators in other exchanges. It is at once evident to her that the operators who are trying to drive their calls through what they consider a badly tangled network of congested circuits are really tying up valuable wires for the transmission of mere idle, useless talk. An experienced toll operator, with a vigorous character, will actually succeed under such conditions in getting her calls through in fairly good time, unless she overdoes the thing, and makes herself too unpopular with the operators at the other terminals of circuits coming to her position. On the other hand, in practicing the various little devices necessary to retain the circuits for her own exclusive use she causes delays in ways which it would be hard for one to appreciate unless he has actually spent a considerable amount of time monitoring on both well and poorly managed toll lines, and toll operators' positions. All these things are evident enough to the chief operator in each exchange where they are going on, but when she attempts to work out a remedy she is handicapped by the fact that a fair share of the faults committed occur at points outside of her jurisdiction.

Of course, the only real and permanent way to improve the efficiency of toll operating, judging this efficiency, for the time being, from the single viewpoint of reducing the proportion of time during any given period when the circuits are not being used by subscribers to the time occupied by the transmission of actual paid conversations, is to get the operators to work together earnestly with this object in view. Proper methods, and above all the proper spirit which must underly the methods, cannot be developed in a day, nor will they result entirely from the issuance of any set of stereotyped instructions. In order to make advances along this line consistent and permanent it has been found that they must necessarily be, to a certain extent, planned by the people at the head of the organization covering a district, whether this head be the division manager of a single large company, or the leader of an association of small operating companies.

Under such leadership a number of useful movements have been started in different parts of the country. Perhaps the one which will prove to be the most interesting is that of holding at intervals meetings of toll operators and chief operators, whose expenses of transportation to the meeting place and during attendance there are paid by their employers. Although the leading of the discussion is in the hands of some officer who has the broad purpose of the meeting well developed in his mind, it has been found that the operators themselves are likely to join intelligently and enthusiastically in such work as is necessary to make the meetings a business success. They talk over the little hindrances which they know they throw in one another's way, and agree to cut them out. Enough agreeable social features are planned in connection with these meetings to make each operator feel that it is well worth while, from the standpoint of mere personal pleasure, to show results which will insure the continuance of the meetings by the companies. These social features have an additional value in promoting that good will between the operators in connecting exchanges, which so effectively supplements those good intentions which tend to promote the doing of efficient work because this is the proper way to handle the interests which the company entrusts to its employees. This mutual good will is, in fact, the basis of a follow-up system, which makes these meetings tend toward the production of permanent results. Chief operators, monitors and line operators, even those separated by miles of wire, come to have a real *esprit de corps,* and take pride in working together and telling one another how they may co-operate to improve conditions.

Those who have tried this plan hope to find that they are striking at the root of things. If undue congestion of toll lines is the result of poor judgment and an improper spirit among the operators, then the operators themselves are the persons who are the closest to the faults. They can get a grip upon wrong conditions more quickly than any one else, and remove them. When they do this the company finds that instead of having to plan new routings, or the construction of new circuits, or even the building of new toll lines, all that is necessary for the time being is to commend the efficient work of the operating department. Providing this is not carried to the extreme of placing an actual overload on the operating department, such a course is a great deal more satisfactory to all persons concerned, including even the users of the service, than the undertaking of new building operations which a subsequent close analysis of business conditions may show to have been unnecessary.

TELEPHONE SERVICE STANDARDS AND PUBLIC INVESTIGATIONS.

HAPHAZARD methods seem unfortunately to be characteristic of a great majority of the investigations of telephone service which are from time to time undertaken by various governing bodies throughout the country. It seems strange that a group of able business men, or city officials, who would not feel qualified to pass upon questions relating to the distribution of service furnished by electric light, gas, or water companies without expert advice, should consider themselves able at a moment's notice to acquire a grasp of the complex organization of a telephone company, and pass upon its efficiency. A telephone man is likely to regard such an attitude with a feeling of amused contempt not wholly unlike that entertained by one of our friends toward a man who announced that he intended to write a book about the telephone business, "after making two or three visits to a typical central office to supply himself with data."

However, there is a possibility that telephone men are themselves very much to blame for the existence of this attitude. They know all the separate characteristics of good and bad service, and are familiar with the practical limits which mark the extreme development of good points, and likewise know how far it is possible to carry the elimination of errors. Also, the men who are most familiar with all the details of such matters know that their information was acquired only by years of work. If a company intends to give good service it will find it profitable to so educate its patrons by frequently supplying them the right kind of information that quality will be intelligently appreciated.

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The Telephone and the Law

CONDUCTED BY A. H. McMILLAN.

AMOUNT OF SUBSCRIBED STOCK NECESSARY TO BEGIN BUSINESS IN MASSACHUSETTS.

How much stock must we have subscribed before we can lawfully commence putting up our lines in this state? We have about one half subscribed, and most of that is paid in cash. J. C.

IN Massachusetts a company cannot commence construction until three-fourths of the capital stock is subscribed for and one-half of it paid in cash. The directors of the company must file a sworn statement as to these facts with the secretary of the commonwealth within ten days after the commencement of this construction. Such a company must not contract nor owe debts to more than one-half of the amount actually paid in capital stock. You are therefore not yet in condition to begin your building. Rev. Laws, 1902, Chapter 122, Sec. 6-7.

RIGHTS OF FOREIGN COMPANIES IN KENTUCKY.

If we incorporate in a foreign state and then try to do business in Kentucky, what rights will we have? J. H. E.

THE rights granted to foreign telephone companies under the laws of the State of Kentucky are quite extensive. Upon making just compensation, such a company has the right to construct, maintain and operate telephone lines through any public lands, and on, across or along all turnpikes, and across and under any navigable waters, and along and upon the right of way and structures of any railroad of the state. Such a company may contract with railroad or turnpike companies, and may condemn a right of way over their lines. To this extent, the rights of a foreign company are substantially the same as those of a company locally organized in the State of Kentucky. Carroll Sts., 1903, Sec. 4679, A.

CONTEMPT PROCEEDINGS FOR CUTTING RURAL LINE.

F. B. LAWRENCE, of Oakesdale, Wash., south of Spokane, has instituted an action in the superior court at Colfax against J. V. Flood and R. W. Duncan to compel them to show cause why they should not be adjudged in contempt for ignoring a permanent restraining order issued at the request of E. J. Doneen, enjoining them from cutting or otherwise interfering with the wires of the Longwell rural telephone line. The trouble started when Doneen leased the exchange in Oakesdale from the Pacific States Company. Prior to this the rural lines were connected with an exchange owned and operated by M. Skidmore. Doneen bought Skidmore's interest on the understanding with the farmer lines that they would be connected with the Pacific exchange, which he had just leased, and in accordance with this arrangement the Skidmore exchange, which was now the individual property of Doneen, was moved into the long distance exchange and connected with the long distance switchboard. Messrs. Longwell did not approve of the plan, and, without notifying all the members of the company, they are said to have cut their line from the relocated switchboard. Doneen instituted injunction proceedings to compel them to refrain from interfering with the line. The restraining order was issued, but the line was cut again, hence the summons for contempt of court.

LINEMAN FREE FROM CONTRIBUTORY NEGLIGENCE.

A TELEPHONE lineman was directed to climb a pole to assist in stringing a wire thereon. An electric light company maintained a highly charged electric light wire, which passed within four inches of the pole. On the side nearest the pole the insulation had been worn or burned off. There was already one man on the pole above the wire, and the lineman testified that he looked at the wire from the ground and the insulation appeared to be all right. He went up on the opposite side, and at the time he reached the wire the pole was swaying, apparently by some action of the man above, and his hands came in contact with the exposed wire resulting in his injury. He brought suit against the electric company, and recovered a verdict. The company carried the case to the Circuit Court of the United States for Massachusetts, and secured a reversal of the judgment. The Court held that the facts did not show him to be conclusively guilty of contributory negligence, but that this question was for the jury. The judgment was reversed on account of an error in the charge of the judge, which tended to lead the jury to determine the question of due care with reference to the particular plaintiff, and his situation and observation, and not by the standard of what a man of ordinary prudence would have done under the same circumstances. Gloucester Elec. Co. vs. Dover, 153 F., 139.

STREET AND HIGHWAY PURPOSES IN NEW YORK.

THE case of Osborne vs. Auburn Telephone Company has been decided by the Court of Appeals of New York, the Court reversing the decision of the Fourth Department of the Appellate Division. The action was brought to enjoin and restrain the company from entering upon the lands of Mrs. Osborne, in Fitch avenue, Auburn, N. Y., for the purpose of digging holes and erecting telephone poles for the stringing of wires, and also to recover the damage which had been sustained to her shade trees. The company had been granted a franchise by the city to use the streets for the erection of poles and stringing of wires. The conveyance to the plaintiff gave her the fee to the north half of the avenue, followed by a reservation for a road which had been opened to the public. The Court held that the plaintiff might restrain the company from erecting its poles in the city streets, on the ground that a dedication of land for general street and highway purposes did not include such a use, and the city had no power to permit it without compensation to the owner.

The Court said: "The learned Appellate Division appears to have entertained the view that there was a distinction between rural and urban property. It is undoubtedly true that the use of highways is many times greater in cities than it is in country towns. We had occasion to consider this question to some extent in the case of Palmer vs. Larchmont Electric Co. (158 N. Y., 231), and in addition to what we then said we only wish to remark that the fee to lands in the city is as sacred to the owner as it is in the country, and that in either place he is protected by the constitutional provision to the effect that property shall not be taken for public purposes without compensation."

The case of Eels vs. American T. and T. Company, 143, N. Y., 133, was also cited. Osborne vs. Auburn Tel. Co. 38 N. Y. Law Journal, No. 37.

APPLICATION FOR QUO WARRANTO AGAINST OHIO COMPANIES.

APPLICATION has been made to the attorney general of the State of Ohio for the filing of a petition in quo warranto for the ousting from their charters of the Marion County Telephone Company and the Central Union Tel. Co., so far as the business of the latter relates to Marion. The application comes about through the agreement made between the Marion Independent company and the Central Union, by which the latter turned over its Marion business to the Independent company, which then connected its exchange with the long distance lines of the Bell company.

A hearing on the application was held in the office of the attorney general December 10. The application for a quo warranto action was asked on three grounds. One of these is that the agreement is a violation of the Valentine anti-trust act, the second that the law prohibiting the combination of telephone companies except under certain restrictions has been violated, and the third is that under the common law the agreement is contrary to public policy.

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Important Items of Telephone News

INTERFERING LABOR LEADERS SENTENCED TO IMPRISONMENT.

ADJUDGED guilty of contempt of court in violating an injunction issued by the court, forbidding them to interfere with the operations of the Rocky Mountain Bell Telephone Company, C. D. Lenihan and Matthew J. Plunkett, of Anaconda, Montana, were sentenced to imprisonment in the county jail of Lewis and Clark county by Federal Judge W. H. Hunt. Lenihan, who was formerly president of the Electrical Workers' Union of Anaconda, was sentenced to four months' imprisonment, and Plunkett to three months. In both cases the defendants were paroled in order that bonds on appeal might be furnished and the cases taken to the court of appeals at San Francisco.

In commenting on the evidence, Judge Hunt expressed the opinion that both Lenihan and Plunkett had falsified on the stand. Only one matter remained open, said the court, and that was whether Plunkett had received notice of the injunction. The court said that no actual notice was necessary, but that constructive notice was sufficient, and that such notice was inferred. The only difference in the cases, remarked Judge Hunt, was that Lenihan had received actual notice of injunction, while Plunkett had not. Disobedience on this account the court could not excuse.

SOUTHWESTERN BELL SUBSCRIBERS OBJECT TO CUTTING OFF OF COUPON BOOK PRIVILEGES.

ANNOUNCEMENT was made some time ago by the Southwestern Telephone & Telegraph Co. that the selling of coupon books for the payment of bills for toll messages at a discount would be discontinued. The reason assigned was that their sale was contrary to the Texas anti-pass law. This measure struck most heavily at the pockets of the principal business men, and they all got together in several of the most important cities of Texas to make their protest a vigorous one. Seventy-five of the leading firms in Dallas, fifty in Houston, thirty-four in Fort Worth, and fifteen in Waco have signed a petition stating that the discontinuance of the use of the coupon books at reduced rates has resulted in an advance of 33⅓ per cent. in toll rates. Eminent counsel, as well as the Attorney General's office at Austin, are understood to have advised the company that there is nothing in this law to prohibit the sale of these books, if offered to the public without discrimination. Inasmuch as the company made a public statement that as far as cash returns were concerned it was satisfied with the existing rates made under the conditions involved in the sale of the coupon books, these heavy telephone users believe and petition that the coupon privilege shall be restored.

TOPPENISH, WASH., WANTS AN INDEPENDENT SYSTEM.

BUSINESS men at Toppenish, Wash., want a local telephone exchange. They now have connections in Toppenish with two long distance lines, the Pacific States and the Yakima Valley system, but local intercommunication by telephone among the business interests is not possible.

The Yakima Valley Company recently received a franchise from the town council, and contemplates installing an exchange. Toppenish now has nearly one thousand inhabitants, and as it is rapidly growing in area and population it is apparent that a local telephone system is necessary.

NEW ASSOCIATION OF OPERATING COMPANIES FORMED IN NORTHWESTERN PENNSYLVANIA.

INDEPENDENT telephone companies operating a total of 7,723 telephones got together at Oil City, Pa., November 20th, and formed an association which would enable them to handle matters of local interest to better advantage. Representatives of the different companies met in the office of the Petroleum Telephone Company, which has exchanges at Oil City, Franklin, Titusville and Pleasantville, and is the largest company in that section of the state. Mr. W. S. Paca, general manager of the Petroleum Telephone Company, presided over the meeting. In the subsequent proceedings the name of the Northwestern Pennsylvania Independent Telephone Association was chosen for the new organization, and Mr. Paca was elected as its first president; L. D. Corey, secretary; J. H. Longstreet, treasurer. Following this, especially interesting talks were given by Messrs. Wright and Paca upon the methods by which the companies could aid each other to form closer relations through the Association. Mr. Knapp, of Clarion, showed a map of his lines, and gave a history of his company from its formation to the present date, when it operates 600 telephones at rates of $18 and $36 for residence and business service. An interesting statement about the conditions of the telephone business which have resulted in good financial returns for their respective companies came from Messrs. Corey, Mitchell, Fry, Shockey and Hamilton. One of the most important subjects discussed was that of providing for better toll line connection, and the handling of messages in such a way as to secure the shortest routing for each one. In order to provide for the satisfactory handling of questions upon which all of the companies are not in agreement, the members agreed upon the choice of a committee of five, including Messrs. Corey, Hamilton, Wright, Knapp and Paca, to adjust any differences which might arise.

This association promises to be an effective aid to its members in the building up of the Independent business in the section in which their lines are located. Mr. Paca, who is taking a prominent part in the movement, is general manager of the Petroleum Telephone Company, and is well known as an able all-round telephone man. One of the valuable things about the formation of the new association is that it will make it easy for the smaller companies interested to obtain the benefit of his advice and that of one another in matters relating to the best methods of operating and construction. All the members expect to pull together with a vim, and show that their organization will be a real factor in building up the Independent telephone business. The men most interested, as shown by their presence at this first meeting, are W. T. McDonald, T. L. Anderson, Harry Hamilton, Eau Claire Tel. Co.; H. R. Shawkey, Venus & Monarch Tel. Co.; A. P. Addleman, Eau Claire Tel. Co.; Mr. Mitchell, Valley Tel. Co.; L. D. Corey, Conneautville Tel. Co.; J. D. Fry, Centreville Tel. Co.; J. W. Knapp, Clarion Tel. Co.; D. W. Moore, W. S. Paca, J. H. Longstreet, Petroleum Tel. Co.; George E. Bower, Venus Tel. Co.; W. W. Shawkey, Venus Tel. Co.; J. W. Wright, Meadville Tel. Co.; Mr. Cottle, Forest Tel. Co.

FIRE INSURANCE COMPANIES LOWER RATE ON INDIANAPOLIS RESIDENCES HAVING TELEPHONE SERVICE.

ANNOUNCEMENT has been made by fire insurance companies doing business in Indianapolis, Ind., that rates on dwelling houses where the occupants are in direct telephonic communication with the fire department will be lowered. It has been agreed that the ability to call the department speedily by telephone considerably lowers the risk of loss. This is shown by statistics, which indicate that the average loss on buildings so equipped is much less than on those in which no telephones are installed.

NEBRASKA INDEPENDENTS COMPLAIN TO RAILWAY COMMISSION OF BELL DISCRIMINATION.

A COMPLAINT of discrimination practiced by the Nebraska Telephone Company in granting the employees of the Burlington Railway system a 20 per cent. reduction on their bills has been entered by R. E. Mattison, secretary of the Nebraska Independent Telephone Association. In the body of the complaint Mr. Mattison states that a specific case of discrimination which is contrary to section 4727 of the Compiled Statutes

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of the State of Nebraska occurred in the operation of the companys' exchange at Lincoln. He goes on to relate that the telephone company charges and collects from Herbert E. Gooch the sum of $2 per month for an individual metallic line residence telephone, while furnishing the same service to four other named persons for the sum of $1.50 per month each. He names three other persons who are receiving two party line metallic circuit telephone service for $1.50 per month, while four named persons receive the same service for $1.20 per month, thus establishing discrimination in regard to a second class of service.

It has been stated by officials of the Bell company that they have evidence of discriminations on the part of the Independents. It is quite probable that the following up of this complaint will result in a full threshing out of the matter before the Commission, and will eventually result in bringing about competition on a sounder basis throughout the state.

TELEPHONE SERVICE INVESTIGATION IN NEW ORLEANS.

IN an endeavor to force better service and lower rates from the Cumberland Telephone and Telegraph Company in New Orleans, La., the Progressive Union, an organization of business men, has mailed to all telephone subscribers in that city, questions in relation to the cost and class of service.

From the large number of replies received it is quite evident that the movement of the Progressive Union has the hearty support of the people. Of four hundred and forty-one replies received the cost was deemed satisfactory by thirty-nine subscribers, too high for the quality of service rendered by one hundred and fifteen, and altogether too high by two hundred and sixty-seven, while twenty evade the cost question. In relation to the quality of the service forty-three subscribers say it is satisfactory, nineteen say it is fair and three hundred and seventy-nine declare that the service is bad. The basis for the conclusion that rates are too high is apparently not stated by the subscribers.

INDEPENDENT TELEPHONE SERVICE PREFERRED IN NEW YORK STATE SCHOOLS.

THE Board of Education at Rome, N. Y., has refused to cooperate with the Central New York (Bell) Telephone and Telegraph Company in its efforts to oust the Independent system from the schools in that city. At a recent meeting of the Board the Bell company offered to install free telephones in the schools of the city for the coming year. The Independent telephone system has been in use in the schools for some time, and the commissioners refused the offer of the Bell company, stating in explanation that the Independent system had given the best satisfaction to the patrons of the school and that the people are willing to pay a fair price for good service.

The school commissioners of Utica a short time ago gave neighboring places a striking example of the good opinion entertained in this vicinity for Independent telephone service. For some years past both the Independent and Bell telephones were used in the schools of Utica. Two years ago the commissioners voted to use only one system and to let the contracts for supplying the twenty-four schools of the city to the lowest bidder. Both companies presented bids and the Independent company won out and gave excellent service to the schools during the year.

The contract system, open to bidders, was continued a year ago, and this time the Bell company was the successful bidder. This year the same system was continued, the commissioners giving the two companies the understanding that the contracts would go to the lowest bidder. The Independent company offered to supply the twenty-four telephones to the schools for $325, but the bid of the Bell company was $12 for each telephone, or $288 in all. Other things being equal the contract naturally would have gone to the Bell company as the lowest bidder, but the commissioners by an unanimous vote agreed to the acceptance of the Independent company's bid, stating in explanation of their action that they considered the service of the Independent company to be superior to that furnished by the Bell people. Furthermore, they said that a majority of the teachers had Independent telephones in their residences and that they believed the continuance of the Independent service would be most acceptable to the patrons of the schools.

GOVERNMENT OF SASKATCHEWAN DECIDES TO BUILD TELEPHONE LINES.

FOR some months past, as is well known to telephone men who have been following the progress of the opposition to the Bell system in Canada, Mr. Francis Dagger has been employed by the government of the province of Saskatchewan to conduct an inquiry into the desirability and feasibility of a government-owned telephone system for the province. Mr. Dagger has received in this work the hearty co-operation of local officers in the various townships throughout the province; and, as a result of the considerable volume of information which he has gathered, it has become apparent that the proper development of systems of communication in Saskatchewan demands the assistance of the government. The great majority of the farmers throughout the province are known to be in favor of such a step.

The Hon. Walter Scott, railway commissioner of the province of Saskatchewan, will have control of further investigations, with a view to preparing for the active work of construction during the coming year. Mr. S. P. Porter, formerly homestead inspector for the Dominion Government, has been appointed deputy railway commissioner, and will devote his attention to railway affairs, while Mr. Dagger will continue to have charge of telephone matters, and will make such preparation during the winter as will enable construction to be commenced immediately after the legislature has endorsed the policy of the Saskatchewan government at its next session.

NEW YORK MANAGERS! HURRY YOUR STATISTICS IN TO THE STATE ASSOCIATION SECRETARY.

MR. R. MAX EATON, Niagara Falls, New York, secretary of the New York Independent Telephone Association, announces that the reports giving information recently asked of the New York State managers are coming in well but that there are still a few delinquents. If these delinquent managers would but consider that in delaying to send in the reports asked for, they are holding up the entire organization in the completion of this valuable work they would get busy and report immediately.

In order that the State Association may organize and plan so that the Independent movement in New York State may enjoy a greater degree of success it is important that a complete record of existing conditions be compiled. This record can be completed only with the aid of each individual manager and owner doing his share and doing it promptly.

MEETING OF THE PITTSBURG BRANCH, AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

THE Pittsburg Branch of the A. I. E. E. met Wednesday, December 4th, in the lecture hall of the Carnegie Institute. Mr. J. H. Schoeff of the Westinghouse Electric & Manufacturing Company, abstracted Mr. Armstrong's New York paper, "Comparative Performance of Steam and Electric Locomotives," emphasizing important points. Among them was the fact that at higher speeds the electric locomotive develops comparatively more tractive effort than the steam locomotive; also that the electric locomotive figured better on mountain grades for hauling freight.

Mr. A. W. Gibbs, General Superintendent of Motive Power of the Pennsylvania Railroad Company, wrote a letter touching on some of the points along which the steam locomotive designer is working.

(*Concluded on page 393.*)

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Recent Telephone Patents

TELEPHONE PAY STATION.

George A. Long, Hartford, Conn., patent 872,628, December 3, 1907.

The object of this invention is to provide for use in connection with telephones of the automatic type, a pay station which will do away with the possibility of the customer's depositing a coin and then failing to obtain connection with the person desired, on account of a busy line or other causes. The present instrument has the coin slot closed when the receiver is on the hook, so that no coin may be deposited. In operation, the subscriber removes the receiver from the hook and makes a call and hears the called party answer; he cannot reply, however, before depositing his coin, because the transmitter circuit is open through a space between two blocks in the pay station mechanism. Accordingly he drops a coin into the slot, and if it is a good coin it passes down through the guides into the above mentioned slot, and closes the transmitter circuit. When the conversation is finished, and the receiver hung upon the hook, the stop is withdrawn from beneath the coin and it drops into the money box.

CABLE TERMINAL AND JUNCTION BOX.

Frank B. Cook, Chicago, patent 871,984, November 26, 1907.

This invention covers a combined cable terminal and junction box, so constructed that the terminal can be mounted on the junction box at any time, either before or after the junction box is installed. To make this possible the junction box is constructed of sheet metal, with a lid closing against a rubber gasket. The bottom is provided with self-soldering nozzles through which cables may be led. Although one of these may be used separately, if it is desired to mount the cable box in connection with it all that is necessary is to attach the cable terminal to its top. The two are fastened together by bolts. Holes through the top of the junction box and the bottom of the cable terminal box respectively serve to admit wires from the cable, and these may be attached to the terminals, arranged to provide for the mounting of fuses and other protective devices. The terminal may be filled with an insulating compound if desired. The whole arrangement is enclosed within a single sheet metal cover.

With this equipment, if desired, certain cable conductors can be carried to the terminal, and distributed therefrom, and others spliced within the junction box, or carried out of the junction box through the self-soldering nozzles or other cables. Also certain cable conductors can be left dead ended in the junction box, or a large cable can be carried to the junction box, and part of the conductors distributed from the cable terminal to nearby instruments, part dead ended, and still others spliced to conductors of other cables. In this way an especially flexible system of distribution is made possible.

METHOD FOR ELIMINATING RESIDUAL MAGNETISM IN MAGNETS.

S. A. Norstrom, Chicago, patent No. 871,042, Nov. 12, 1907, assigned to C. L. Redfield, Chicago.

The system described in this patent has for its object the provision of means by which magnets used for operating switching mechanism in step-by-step selective systems are relieved of their residual magnetism so that their armatures will not stick to them when the circuit for operating is broken. This is accomplished, so states the inventor, by causing each operating impulse to be automatically followed by an impulse in the opposite direction, of such short duration that it is without effect upon the magnets other than to relieve them of their residual magnetism.

TELEPHONE BOX HANGER.

J. G. Malaby and Chas. E. Oxford, Foreman, Ark., patent 872,832, December 3, 1907, assigned to J. G. Malaby.

The inventor describes a method of fastening a telephone box to the wall in such a way that it may be readily removable without the use of tools. He proposes to insert in the opposite edges of the telephone backboard pairs of pins extending outward, one pair being near the top and the other near the bottom. He has designed a supporting member, comprising a screw threaded shank, adapted to screw into the wall, and continued in a portion extending at right angles to the screw, which will project upward for a short distance, and then take a peculiar curved shape which will cause it to spring away from the wall in the form of a hook. All that is necessary to mount the telephone when these hooks have been set in place is to place the backboard between them, and allow it to slide downward until the pins are engaged by the hooks.

MEETING OF THE PITTSBURG BRANCH, AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

(*Concluded from page 392.*)

Mr. Malcolm MacLaren, formerly of the British Westinghouse Company, discussed the subject of steam versus electric locomotives—capacity limitations. He discussed the 1200 volt D. C. system and compared it with the A. C. system. He stated that for some speeds and work the D. C. was more economical, but on a whole discouraged the use of the high voltage D. C. system.

Mr. W. Cooper, of the W. E. & Mfg. Co., discussed the subject of steam versus electric locomotives from the control standpoint. He made some very good points regarding the braking of long trains on steep grades, calling attention to the fact that the electric trains can be braked by means of electrical control while on some steam roads great trouble is experienced from hot brake shoes and wheels. He also pointed out how it was possible to run trains of practically any length by an arrangement of electric locomotives distributed through the train and controlled by one man, which is impossible with the steam locomotive.

Mr. N. W. Storer discussed the subject of the evening from a broad standpoint. He stated that it was not practical for steam roads to change over all their equipment at once from steam to electric, but that it would pay to electrify a great many terminals and mountain divisions with steep grades.

Mr. Edwin Reid of the National Cable Company of London, made a few remarks. He mentioned one thing which was hard for the Englishman to understand and that was, why the American people would stand for so many delayed trains. He claimed that in England as a rule trains are always on time.

Mr. Paul Lincoln answered a question as to the comparative coal consumption of a steam locomotive system and an electric system.

Mr. C. F. Scott called attention to the greater cleanliness of the electric locomotive. He also pointed out that all the limitations of the steam engine had been exceeded by the electric locomotive. He had just received word from Indianapolis that an electric locomotive was making a 586 mile run per day.

SOUTH BEND COMPANY ARRANGES FOR CONNECTION TO MICHIGAN LINES.

REPORTS from South Bend, Indiana, are to the effect that Theodore Thorward, president of the South Bend Home Telephone Company, has just completed negotiations with the company at Cassopolis, as a result of which final connections will be made in a few weeks between South Bend and Grand Rapids, and through the exchange at that place with 88 cities and towns in Michigan, including Detroit. The deal at Cassopolis enables connection with Diamond lake district and other points. Dowagiac, Mich., on December 2d opened a fine exchange, which has direct connection with South Bend.

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IN TEXAS—Exceptional business opportunity for practical telephone man with $6,000 and services, to invest in stock of telephone company that is paying 20 per cent. in dividends. Town of 7,000 population. 550 'phones in service. No competition. Reach exclusively, over our own toll lines, 30 stations. Connect with long distance company that covers the whole State. A practical telephone man purchasing this stock, that can show the proper references, will be elected secretary-manager of the company at a salary of $100 per month. Address W. P. Donalson, North Texas Building, Dallas, Texas. 981

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For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

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WANTED—Position as general foreman for telephone manufacturer of instruments or inside wiring or line construction; can give best of references. also refer to the company I am now with. Address Box 979, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 979

LOCATION WANTED—In some good Western town of three or four thousand, where I can install a telephone and electric lighting system. Have been in the business ten years, and am willing to invest money with reliable parties. Will furnish one-half of the capital in good, growing town. Want location where climate is mild. Can furnish best of references. Address N. B. Stadley, Shelburn, Indiana. 982

WANTED—Good, all around telephone man, with practical experience in common battery switchboard and instrument work. Must be capable, sober and industrious. Preference given to man capable of handling labor to advantage. State references and lowest salary. Western Electric apparatus used almost exclusively. Address Box 985, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 985

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Steel Foot Rest—Seat and Back readily adjustable to occupant—Height of Chair easily regulated. Frame work made of Bessemer Steel, ⅜ (three-eighths) inch rods twisted and interwoven. Wood work, oak, birch or mahogany finish, as preferred. Metal work heavily plated, Japanese copper finish.

The Most Comfortable High Chair Made

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24-inch high **28-inch high**

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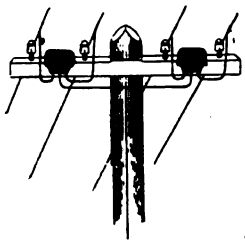

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whether it is wearing a perfect straight front, or something cut bias.

The short, vertical, self-cleaning air gap, double pole and weather proof features of the Chapman Arrester make an ideal form of Lightning protection.

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Do you want a cheaper wire which will last for years and give good service on lines of ordinary length?

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What the Manufacturers Are Doing

SUMTER TELEPHONES FOR MILITARY USE IN CUBA.

LARGE orders for telephones for the use of the United States government are being frequently received by the Sumter Telephone Mfg. Company, of Sumter, S. C. The last shipment is for the army corps now stationed in Cuba. Reports from the Southern States indicate that the Sumter company has acquired a very strong position in this section, as its apparatus has been installed in many exchanges and is giving excellent satisfaction. A recent issue of the "State," the leading newspaper published at Columbia, S. C., calls attention not only to the leading place assumed by this company as a manufacturer of Independent telephone apparatus, but also to the unique methods which have been introduced owing to the remoteness of the Sumter factory from other large manufacturing establishments. This has made it necessary to work up practically every single part of the telephones and switchboards from the raw material. The purchaser reaps the advantage of this method of manufacture, as the company has developed its plant and methods of handling work to a point where it is able to give the most careful attention to producing the best results in each detail. It is therefore an advantage to have all of the operations carried on under the supervision of its own experts,

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COPPER GOSSIP, a four-page paper issued by the National Conduit & Cable Company, 41 Park Row, New York, calls attention to the conditions which have caused the small fluctuations in the prices of copper during the past few weeks, in its latest issue. Figures for current production in the leading mines are shown, and an attempt is made to outline the cause of foreign purchases for speculation, etc., upon the copper market.

A TEXT BOOK UPON CABLE TESTING.

TELEPHONE men are always looking for reliable information which will show them how to locate troubles in their lines and instruments promptly, accurately and without complicated figuring. The Leeds & Northrup Company, 4901 Stenton avenue, Philadelphia, Pa., has long realized the urgent demand for information of this class, set forth clearly but concisely, for the use of purchasers of its apparatus. It has accordingly compiled, with the assistance of several of the most able telephone engineers in the country, a text book upon cable testing. The company is sending out circulars describing the scope of this book, with a postal card enclosure, upon which a request may be made for a copy. These circulars will be cheerfully forwarded to managers of telephone companies or men in charge of maintenance work upon receipt of a request.

THE CARBOLINEUM WOOD PRESERVING COMPANY, of Milwaukee and New York City, announces that it has secured the services of Mr. George S. Blanchard, who, until recently, was interested in lumber, and more particularly treated lumber on the Pacific coast. Mr. Blanchard will make his headquarters in New York City at the company's office and will also be actively engaged in supervising the treating operations of the Carbolineum Timber Treating Company, which is the only wood preserving company on the Atlantic coast using the natural vacuum process. With this process Mr. Blanchard has had considerable experience on the Pacific coast, where this method is very extensively employed, the company having five plants in operation at various points in Washington and Oregon. Special attention will be given to the treatment of ties, poles, bridge timbers, etc. Mr. Blanchard is the author of several interesting articles on wood preservation which appeared from time to time in Western journals.

SECURITY POLE DISTRIBUTING RINGS, made by the F. Bissell Company, Toledo, O., present some interesting points making for neat and durable construction which should interest all telephone managers. High insulation is a feature which must necessarily be secured in circle tops, and in the security ring this is provided for by supporting the glass insulators on wooden pins. The iron bolt which passes through each pin does not touch the glass, nor does the glass touch the iron ring. The horizontal braces and the ring itself are furnished with bridle rings. In order to make it unnecessary to bore holes which would weaken the wood, the design of this top provides for fastening by braces which may be so set in place as not to weaken the pole in any manner. There are several other good points about this type of equipment, which will be explained by the manufacturers to interested persons who ask for information.

BLUE PRINTING BILLS are the subject of periodical investigations among the larger telephone companies who are inclined to believe that they spend too much money for this class of work. The Buckeye Engine Company, of Salem, O., manufacturer of blue printing machines, is prepared to show how much it will cost a company to do its own blue printing and to tell about its machines for producing the right kind of work at the lowest cost. Just at the present time advantageous purchases of the material which goes into these machines have made it possible to offer a lot at a very largely reduced price, which will be quoted upon application.

BOSTON CABLE CLIPS, "Shawmut" Two Piece Ground Connection Clamps and other specialties are illustrated and described in a recent bulletin issued by the CHASE-SHAWMUT COMPANY, of Newburyport, Mass. The Boston cable clip has been on the market for a number of years and consists of a galvanized hook with clamp lock in connection with a zinc strap. "Shawmut" ground clamps are said to be especially adapted for grounding wires on pipes and are made in sizes from ½" to 3". Bulletins will be sent to those interested.

ONE OF THE REASONS given by the ELECTRIC APPLIANCE COMPANY, 134-140 West Jackson Boulevard, Chicago, for telephone companies purchasing supplies from it, is its ability to make prompt shipments. The company carries a complete stock of telephones, construction material, linemen's tools, etc.

The Stromberg-Carlson No. 842 Test Set.

LINEMAN'S TEST SET.

AN instrument which ought to stand the roughest kind of handling and continue to work efficiently has been provided in the newest form of test set for the use of linemen, manufactured by the Stromberg-Carlson Telephone Mfg. Company, Rochester, N. Y. As will be apparent from the illustration upon this page, all the apparatus is arranged in a well constructed box of heavy oak. In order to prevent any possibility of

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THAT IT IS
EASY TO PHONE
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IT IS HOW YOU HEAR

¶ The subscribers are pleased.
with it because it is so easy.
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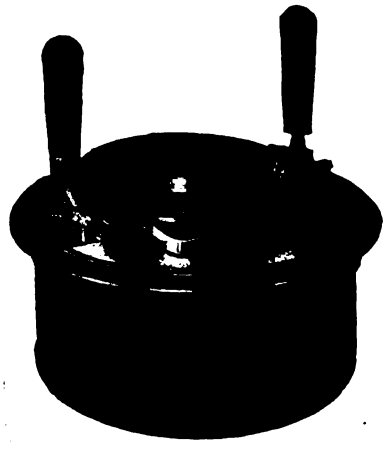

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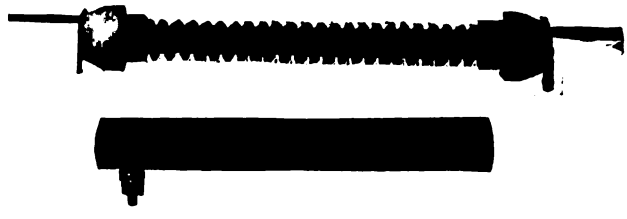
Designed by practical men for a practical purpose and used by men who know a good thing when they see it, because



Sky Rocket Arrester With Ground Shell Removed.

they relieve entirely all cause for worry about lines and apparatus during electric storms.

EFFICIENT—CHEAP.

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CENTRALIA, MO.

See Our Exhibit at the Electrical Show, Chicago, January 13-25, 1908.

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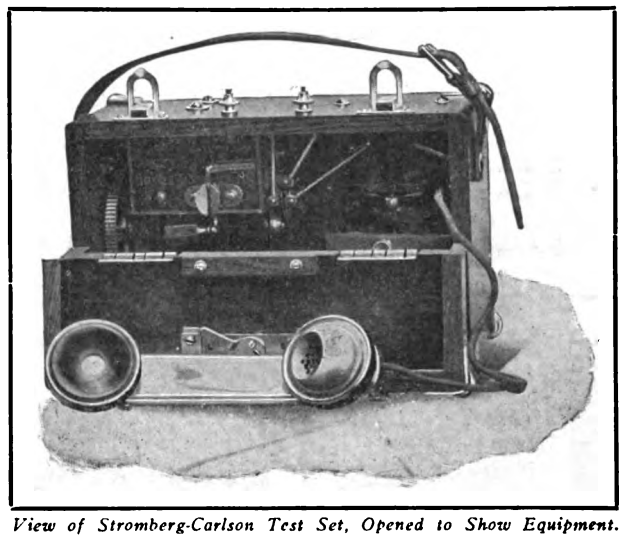
splitting away of the wood, the corners are reinforced, and protection at each of the eight exterior corners is furnished by heavy cast trunk corner knobs. Hinges and snap catches for the door are of strong design and have plenty of metal in them. A sole leather carrying strap of heavy stock is arranged for taking an extra long strap if necessary.

In the arrangement of the apparatus and circuit one finds a number of especially interesting and useful features. For example, a ½ M. F. condenser is cut into the receiver circuit, and this makes it unnecessary to install a switch hook in the box to break the line circuit. With this arrangement the instrument may be rung at any time when on the line. A complete hand micro-telephone, the general features of which are apparent from the second illustration, and have been described in a previous article, is arranged to rest in the open part of the box. This is of metal construction, which will insure durability which will be appreciated by both linemen who use it and the executive officers of the company which have to pay for it. A push button is provided in connection with the transmitter, so that battery is only cut in when necessary, and there is no continued wasteful consumption of battery during the entire time that the receiver is off a hook. The arrangement of the circuits of the generator and ringer provides for the shunting of the bell when the lineman rings, so that the full voltage of the generator goes to the line, and none of it is short circuited through the bell. In this way the greatest power is obtained from the generator.



View of Stromberg-Carlson Test Set, Opened to Show Equipment.

The manufacturers have assigned to the three different instruments of this type which they put upon the market the code numbers 841, corresponding to three bar equipment; 842, corresponding to four bar equipment; and 843, corresponding to five bar generators. In this way provision is made for the use of this type of test set in exchange districts of all classes, including those having heavily loaded farmers' lines. Any further information desired may be obtained from the manufacturers.

ADDITIONS TO THE DEAN FACTORY.

THE kind of buildings being put up by the Dean Electric Company, and the equipment which is being installed in them, show clearly enough the high grade of facilities which are required for the production of modern Independent telephone apparatus. In the new power plant at Elyria the Dean company has had installed Stirling type Boilers producing 600 lbs. steam pressure for power and heat; Ball type Horizontal Cross-Compound Engines are directly coupled to Crocker Wheeler Generators, two complete units operating independently, and power is properly distributed through a four panel switchboard built to handle the total output, about 600 kilowatts. The company has prepared postal card illustrations of this power plant and also of the new factory, with the exception of a warehouse, providing 10,000 square feet storage space, which is not shown on the card. These postal cards will be sent upon receipt of requests from persons who wish to know how the Dean factory looks.

A LITTLE LEAFLET illustrating and describing subscribers' station protectors is being mailed to the trade by FRANK B. COOK, 238 W. Lake street, Chicago. Five types of protectors are shown which comprise quite a complete line adapted for various usages. The booklet calls attention to the fact that such apparatus means life, fire and accident insurance and that the types of protectors illustrated are approved by the Underwriters' National Electric Association. A representative type in the booklet is the B-9 protector, which is designed for either indoor or outdoor use. The tubular fuses and carbon lightning arresters are mounted in a heavy porcelain casting equipped with a strong cover held in place by a strong brass bolt. There are no screw holes inside the base to allow moisture to penetrate, but instead the protector is fastened to buildings, etc., by means of holes outside the base. The line wires enter the protector through holes in porcelain lugs which are cast on either side of the porcelain box. A copy of this booklet may be had by addressing the publisher.

VALUABLE DATA ON CREOSOTED WOODEN POLES have been published by Richard Wade, Sons & Co., Ltd., Hull, England. This firm owns extensive pole yards from which shipments are made not only throughout Great Britain, but to many points in the Colonies and foreign countries. This company is noted for its efforts to give its customers the advantage of all the information it can collect about poles. Much useful work has been done in the way of making special studies of the strength of poles, improving methods of preservation, and acquiring familiarity with the special requirements of different classes of transmission systems in which wooden poles are used for supporting wires. The company has now published a 90 page book, well bound in cloth, giving some especially interesting data derived from an exhaustive series of experiments to determine the characteristics of wooden poles especially designed for overhead power transmission. While most of the data apply to 'A" poles and so are not applicable to telephone work, a few of the tables dealing with strength, breaking load, wind pressure, deflection, etc., will be very interesting to telephone engineers. The tables which are given were worked out by Prof. Goodman of Leeds University, who was in charge of the experiments. Telephone engineers or persons in charge of telephone systems in any part of the world are invited by Messrs. Richard Wade, Sons & Co. to correspond with them with a view to obtaining copies of this book.

THE K. & B. COMPANY, of which Richard L. Binder is president, will remove on January 1, 1908, from its present location in Philadelphia to the southeast corner of Eighth and Chestnut streets.

The company announces that, although it has been able to secure this location in the centre of the business section of Philadelphia, it will continue to maintain its reputation for selling high class material at low prices. Among the goods of special interest to telephone men in which this company deals are yellow pine cross-arms, oak and locust insulator pins and brackets, and telephone booths, as well as other goods advertised from time to time, in connection with the company's well known phrase, "Special Electrical Supplies," which appears on all advertising.

JAMES GOLDMARK, 83 Warren St., New York City, has been appointed agent for the well-known specialties of the Blake Signal & Mfg. Company, 246 Summer St., Boston, Mass. These include the Blake "insulated staples" and "compressed cleats," which give an altogether satisfactory method of fastening wires to plaster walls, wood work, etc., in addition to the Blake "tube flux," the advantages of which for soldering have been described in AMERICAN TELEPHONE JOURNAL, and the Blake system of railway signals.

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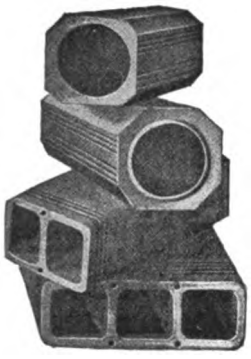

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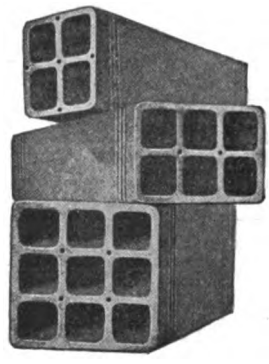
CLAY CONDUIT



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"Leave not that to chance, which foresight might provide for or care prevent."

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But we have him safe!

WE will furnish the "Arrester,"
YOU furnish the "Good Ground."

REMEMBER! without "Good Ground" "Arrester" has no place to take him.

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News from the Field

NEW COMPANIES.

RED BLUFF, CAL.—Plans are under way for the organization of a Farmers' Telephone Company, whose purpose it is to install a telephone system for the people of Antelope Valley. Option has been secured on a line now running from Red Bluff to Antelope, and the organizers of the new company intend to continue this to Manton, and to erect additional lines until the entire surrounding country is covered. R. L. Swanson and others are interested in the proposition.

LITTLETON, ILL.—Articles of incorporation have been filed by the Littleton & Brooklyn Mutual Telephone Company of Littleton. It has a capital stock of $1,000, and the incorporators are Herman Yaap, John Crawford and John Day.

HAMMOND, IND.—The Interstate Automatic Telephone Company, of Hammond, has been incorporated with a capital stock of $10,000 and the following directors elected: C. J. Huff, T. A. Hall and V. H. Huff.

OLPE, KAS.—At a recent meeting held at this city the farmers decided to organize a co-operative telephone company, for the purpose of constructing, maintaining and operating a modern telephone system. The name chosen for the new company was the Center Township Telephone Company, and the following officers were elected: W. H. Watkins, president; John Lutz, vice-president; M. Lister, secretary, and J. Kuhlman, treasurer. Others interested in the enterprise are E. J. Dunkin and Charles Madison.

SCOTTSVILLE, KY.—The Bay's Fork Telephone Company has been incorporated with a capital stock of $50.00, for the purpose of constructing a telephone line from Bay's Fork creek, north of Scottsville to the latter city, and the following officers have been elected: A. Welch, president; D. H. Read, secretary and treasurer. The directors are D. H. Read, J. A. Read and R. A. Read.

DAGGETT, MICH.—The Daggett-Nathan Telephone Company, which is being organized by citizens in Menominee county, has filed articles of incorporation. The new company, the directors of which are C. W. Wilkins, Eugene Houte and Charles Erickson, of Nathan, and Paul Perrizo and D. B. Landsborough, of Daggett, contemplate the construction of a system which will in the beginning operate between Daggett and Nathan, but which will ultimately extend to Faithorn Junction, Norway and other points.

CARVER, MINN.—Among the newly organized Independent telephone companies is the Carver Telephone Company, and those interested in its formation are O. C. Brunius, J. J. Farrell, John Hebeisen, John Funk, Olof. R. Hansen, G. F. Hebeisen, Alois Loew, H. A. Widstrand, C. E. Funk, H. D. Meyer, John S. Nelson, Vitalis Ahlen, and J. E. Larson, of Gotha.

GOUVERNEUR, N. Y.—Arrangements for the formation of a new Independent Telephone Company at this city are nearing completion, and it is expected that the organization will be effected by the first of the new year. Application for a franchise is to be made, and an up-to-date system is to be installed at an early date.

SMYRNA, N. Y.—An Independent Telephone Company, whose purpose it is to construct a line from this city to Otselic, where connections are to be established with the Parker and Newton lines, has been formed, and it is expected that work on the system is to be commenced at once.

LIBERTY, N. C.—The Liberty Telephone Company has been organized and plans for the erection of a telephone system from Liberty, Randolph county, to Climax, N. C. The capital stock is given at $10,000.

SANBORN, N. D.—Among the newly organized Independent telephone companies is the Barnes County Telephone Company, of Sanborn, N. D. It has an authorized capital stock of $25,000, and among the incorporators are D. F. Siegfried, Fred Noecker, Alvin Noecker, all of Sanborn, N. D., and F. E. Corson, of Fargo, N. D.

COVINGTON, O.—A meeting was recently held by representative business men of Covington for the purpose of organizing an Independent telephone company, which is to be financed exclusively by citizens of that city. Plans are said to be fairly well matured, and application is expected to be made to the city council for a franchise at an early date.

NEVADA, O.—Articles of incorporation have been filed by the Nevada Telephone Company. The capital stock is placed at $30,000, and the incorporators are Abe Swartz and others.

CLARK, S. D.—A new Independent telephone company, to be known as the Garfield Telephone Company, has been organized at this city, and the following officers elected: President, J. A. Bickett; secretary, L. L. Kloster; treasurer, Nels Hofstad. A thoroughly modern system is to be installed at Garfield, and lines extended into Mt. Pleasant township.

ORTLEY, S. D.—The Ortley Telephone Company has been organized, and work on the construction of its system to Summit already commenced.

RAYMOND, S. D.—Articles of incorporation have been filed by the Raymond Telephone Company, and work on the construction of its system in this city has already commenced. Its lines are also to extend north of Raymond.

WILLOW LAKE, S. D.—A Rural Telephone Company has been organized by the farmers northwest of Willow Lake, and lines are to be built to Vienna. The officers of the new company are: President, John Vorseth; secretary, Elmer Anderson.

SHELL LAKE, WIS.—The Bashaw Valley Telephone Company, of Shell Lake, Wis., which has a capital stock of $10,000, has been incorporated by E. H. Allen, R. B. Golden, J. M. Smith, Owen Patnaude and Eugene Mead.

DEBEC, N. B., CAN.—An Independent Telephone Company, to be operated under the name of the York & Carleton Telephone Company, has been organized by Joseph S. Merrithew, B. D. Hoyt, J. Y. Flemming, H. H. Kirkpatrick and G. B. Martin, all of Carleton county. The company, which has a capital stock of $5,000, divided into five hundred shares, expects to construct, maintain and operate a telephone system within York and Carleton counties, with headquarters at Debec.

FRANCHISES.

CONCORDIA, KAS.—Application has been made to the city council of Concordia by the Farmers' Telephone Company for permission to establish a telephone system in that city.

BUCHANAN, MICH.—The application of the South Bend Independent Telephone Company for a franchise to operate in this city is being considered by the city council.

COVINGTON, O.—At a recent meeting of the Covington Board of Councilmen a resolution was passed directing that an ordinance be drawn up and advertisements inserted for the sale of a franchise to build and operate an Independent telephone system in this city. Among the possible applicants for the franchise are the Fitzsimmons Telephone Company, of Cincinnati, and a number of Covington capitalists, headed by Joseph Moser, who is Mayor of West Covington and president of the Merchants' National Bank.

ELECTIONS.

FT. WAYNE, IND.—The following officers and directors have been elected by the Home Telephone & Telegraph Company: Charles S. Bash, president; J. B. Reuss, vice-president; William Moellering, secretary and general manager, and Max B. Fisher, treasurer. The directorate is composed of Charles S. Bash, John B. Reuss, William Moellering, Max B. Fisher, P. W. Smith, W. A. Bohn, Isador Lehman, G. Max Hoffmann and Geo. T. Fox.

GRAWN, MICH.—The following officers have been elected by the Grawn Rural Telephone Company, of Grawn, Mich. President, Chas. B. Dye, Traverse City; vice-president, L. A. Moyer, Monroe Center; secretary, Malcolm Hargraves, Monroe Center; general manager, Fred E. Hill, Grawn.

DEERFIELD, MICH.—At its recent annual meeting the Farmers' Telephone Company elected the following officers: President, E. Gibson; vice-president, John Cribbin; secretary, G. E. Rusling; treasurer, B. C. Klotz.

PITTSTON, PA.—At its annual meeting held at this city the Commonwealth Telephone Company elected the following officers and directors: James McCluskey, president; John Thorborn, vice-president; M. L. Perrin, treasurer; W. D. Gay, secretary and general manager; directors, M. L. Perrin, Pittston; R. N. Hughes, Pittston; John H. Foy, Pittston; W. L. Foster, Pittston; Geo. A. Carter, Meshoppen; Truman S. Vaughn, Lovelton; E. W. Thompson, Factoryville; A. D. Dean, Scranton; Fred Jenninga, Tunkhannock; William Shafer, Fleetville; James McCluskey, Harding.

FINANCIAL.

MINNEAPOLIS, MINN.—The Tri-State Telephone Company has declared its eighteenth quarterly dividend at the rate of six per cent. per annum, to the stockholders of record of November 20, 1907. Under its guarantee the company will also pay the twenty-third quarterly dividend of the Twin Cities Telephone Company at the rate stipulated.

TRUMBULL CORNERS, N. Y.—At a recent meeting of the board of directors, the Trumbull Corners Telephone Company declared a dividend of five per cent.

JOHNSTOWN, PA.—At its annual meeting in this city on January 20th, the stockholders of the Johnstown Telephone Company will consider the advisability of increasing its capital stock from $600,000 to $1,000,000, the additional amount to be employed in the extension and improvement of the company's plant.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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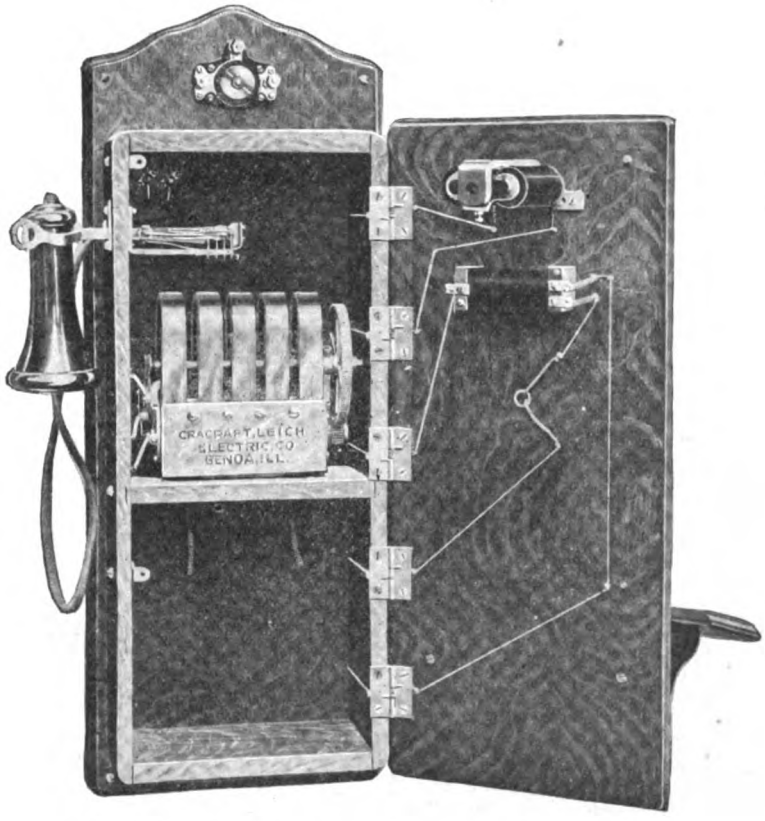

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News from the Field

MISCELLANEOUS.

CABERRY, ILL.—The telephone system at Cabery, Ill., has been purchased by N. A. Watts, of Naroa, and many improvements in it are to be made under his management.

MERRITT, ILL.—The telephone system of Scott county, which is known as the Northwestern Telephone Company, and which consists of a farmers' line running between Markham and Riggston, was recently acquired by Thomas Hardwick, of Merritt.

WATSON, MINN.—A meeting was recently held at this city by a number of the business men, with the object of organizing a local telephone company to take over the Watson exchange of the Citizens' Telephone Company. The following committee has been appointed to solicit subscriptions for stock: Martin Myers, John Aamot, Henry Anderson, Nels Iverson and John Torgerson.

HUMANSVILLE, MO.—The Humansville Telephone Company, formerly owned by Joseph Rogers of Humansville, which is considered to have one of the best equipped exchanges of any city of equal size in the state, has been acquired by Slayton Cavin, of Springfield, the consideration being $15,000. The new owner expects to take possession of the plant at once, which is to be greatly enlarged and improved under his personal supervision.

SPENCERPORT, N. Y.—The recently organized Ogden Telephone Company, which is to construct and operate a telephone system between Spencerport, Ogden, Parma and other places, is to be capitalized at $25,000, and the following are to be the directors: Frank C. Blackford, Adams Basin; Charles Gallup, Parma; Lewis W. Adams, Ogden, N. Y.

NINEVEH, PA.—Plans are being discussed looking toward the establishment of connections between the farmers' line centering at Nineveh and the State Mutual Telephone Company, and the Greene County Telephone Company, which operates a number of telephones in Washington and Greene counties.

FAIRMONT, W. VA.—Negotiations are under way by Messrs. Barnes and Manley, of Fairmont, representing the Fairmont Telephone Co., for the purchase of the Morgantown and Kingwood Telephone Company.

COON VALLEY, WIS.—The Coon Valley, Wis., branch of the American Society of Equity has formed a preliminary organization to build a farmers' line out of this city with J. K. Rundahl as chairman of the soliciting committee.

APPLETON, WIS.—The Fox River Telephone Company, which has just completed a new exchange building at Appleton, and which operates at Green Bay, Depere, Wrightstown, Kaukauna, Weyauwega and New London, has acquired the Wolf River Telephone Company. It is its intention to install new instruments and cables, and to thoroughly overhaul the plant which it has purchased.

PERSONAL.

W. B. T. BELT has been appointed vice-president and general manager of the Nebraska Telephone Company at a recent meeting of the Board of Directors. This is a promotion from the position of superintendent formerly held by Mr. Belt.

CHARLES T. DANIELS has been appointed assistant manager of the Ozark-Bell Telephone Company, with headquarters at Springfield, Mo.

RALPH L. HAVEN has been promoted from the management of the San Bernardino exchange of the Union Home Telephone Company to the management of the district comprising the exchanges in Riverside, Colton and Highland, in addition to that of San Bernardino.

Building Ahead

DOUBLE SPRINGS, ALA.—A line between this city and Haleyville is being constructed by the Winston County Telephone Company, whose purpose it is to build a number of additional lines, until the surrounding country is entirely covered.

QUINCY, CAL.—It is expected that work on the Forest Reserve telephone lines between Quincy and Prattville is to be commenced at once. Among the other extensions planned are lines from Prattville to Humbug Valley and Little Grizzly Valley, from Quincy to the summit of the Clairmont mountain, and through the Diamond mountain country.

McCAMMON, IDAHO.—The McCammon Rural Telephone Company has under consideration the construction of about thirty-three miles of new line out of this city.

EL PASO, ILL.—Many changes and improvements in its plant are under way by the El Paso Telephone Company, which, when completed, are expected to make its plant a thoroughly modern one in every particular.

MOLINE, ILL.—The Union Electric Telephone & Telegraph Company is considering the advisability of establishing an exchange midway between East Moline and Silvis, which would enable it to serve both communities from one exchange, provided rights are secured in East Moline.

PONTIAC, ILL.—Work on the construction of the plant of the Livingston County Home Telephone Company, upon which a large sum of money has already been expended, is to be carried on at a rapid rate under the direct supervision of A. Vernier, of Kankakee.

GOSHEN, IND.—It is estimated that about $25,000 is to be spent by the Goshen Home Telephone Company in the contemplated improvements to its plant.

HARRIS, KAS.—The Harris Telephone Company is overhauling its old lines, building several short new lines, and working in co-operation with the Waverly, Kas., exchange in installing a toll line between Harris and Waverly.

WICHITA, KAS.—Plans are being discussed by the Independent Telephone Company for the installation of a new exchange on the West Side of this city.

PRENTISS, ME.—New lines between Prentiss and Kingman are being erected by the North Penobscot Telephone Company.

ONEKAMA, MICH.—The Onekama Telephone Company, which has connections now with Manistee, expects to install an exchange at Bear Lake, and build lines throughout the Bear Lake territory.

HARMONY, MINN.—Many improvements and extensions in its plant are being considered by the Harmony & Bristol Telephone Company.

HENDERSON, MINN.—The lines of the Henderson Telephone Company have been extended to Jesseeland, and other improvements in its system are to be made.

PRESTON, MINN.—The Norwegian Telephone Company has been rebuilding its lines at this city.

CANTON, MO.—Among the improvements planned by the Citizens' Telephone Company of this city are the rebuilding of a number of its old lines and the construction of additional new ones. The proposed construction work will establish connections for the Citizens' Company with Calwood and Fulton.

PINOS ALTOS, N. M.—The Grant County Telephone Company, which has recently completed for the government a line to this city from Silver City, expects to extend the system to Gila Hot Springs and over the Gila National Reserve. Lines are also to be erected to Cooney and Mogollon, which will give the citizens of Silver City direct communication with the prosperous mining camps of the Mogollon country.

FLEMING, N. Y.—The Southern Cayuga Telephone Company, which has just completed the erection of a line from Fleming to Union Springs, is considering still further improvements in its system.

MILFORD, N. Y.—The lines of the Otsego Home Telephone Company are being extended in this city.

CASSELTON, N. D.—The North Dakota Independent Telephone Company, which is making extensive improvements over its lines in the western part of the state, and at Fargo as well, expects to recable and practically reconstruct its exchange at this city. A new line from Garrison to Plaza has been completed, and it is expected that through connections with the Northern Telephone Company, Minot, Willston and many other points will be reached.

RICHARDTON, N. D.—A long distance line from Richardton to Mott is being constructed by the Cannon Ball Telephone Company.

RUGBY, N. D.—The Brazil Telephone Company, of Brazil, is planning for the installation of a complete up-to-date telephone system at Rugby, in which many of the wires are to be placed underground.

BOYERTOWN, PA.—A line from Boyertown through the Oley Valley to Friedensburg, a distance of about fourteen miles, is to be built by the Consolidated Telephone Company.

ENTERLINE, PA.—Among the improvements planned by the Enterline-Halifax Telephone Company is the erection of a line through the Small Valley.

MADISON, S. D.—A telephone system has been installed by the South Dakota Central Railway, by means of which communication has been established between Madison, Rutland, Nunda, Sinai and Volga.

HOUSTON, TEXAS.—Work on the construction of the system of the Home Telephone Company at this city, which is to cost in the neighborhood of $600,000, is to be commenced in about sixty days by the organizers, Messrs. Reed and Slusher.

SUPERIOR, WIS.—The Superior Rural Telephone Company is building new lines in Superior and expects shortly to establish connections with the People's Telephone Company.

CALEDONIA, ONT., CAN.—The Independent Telephone Company is at work on the construction of its plant.

MACLEOD, ALTA, CAN.—Work on the government telephone line, which has already reached Frank, Crow's Nest Pass and Macleod, is progressing rapidly outside of that city.

UNDERGROUND.

CRETE, NEB.—Work on its underground system is being carried on in this city by the Independent Telephone Company.

MIDDLETOWN, O.—Work on its conduit system in this city has been commenced by the Home Telephone Co.

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Single copies, 10 cents. Subscription price, $1.00 a year. Foreign countries $3.00 a year.

The American Telephone Journal

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VOLUME XVI. SATURDAY, DECEMBER 21, 1907. NUMBER 25.

Rules for Operating Room Employees

A Complete Set of Instructions and Rules for the Government of Local Operating Room Employees.

COMPILED BY KENDALL WEISIGER.

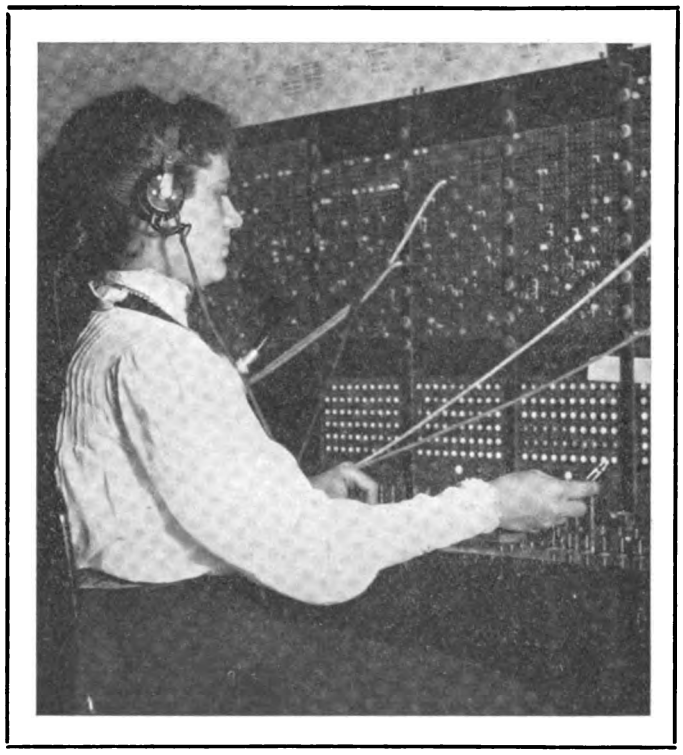
Illustrations from special photographs by John Putnam.

CENTRAL offices in cities where there are more than one exchange are likely to be equipped with trunks terminating at the other offices in the same district in a cord and plug at a trunk, or "B" position. Connections over these trunks are put up in accordance with instructions transmitted from operator to operator over a special circuit known as an "order wire" or "call wire." The method of handling connections over such trunks is covered by the following:

(a) While repeating the number to the subscriber select the proper call circuit button.

¶ In offices using several call circuits it becomes necessary to designate the buttons so that the operators may readily identify them. This is accomplished by engraving on the upper surface of the button a letter or letters which will indicate the office in which the call circuit terminates. An extra button is reserved for emergency use, and when it becomes necessary to use it the operators are informed either over the "instruction circuit," if there is one, or by the supervisors. This button is sometimes made of a different color to distinguish it from the others.

(b) As soon as the number has been checked to the subscriber throw the listening key with the right hand, press the call circuit button with the left hand *and listen to make sure that the call circuit is not in use.*



"It is the practice with some companies to require their operators, when not engaged, to hold a plug ready to instantly answer a line signal. This is the cause of an uneven service."

(c) If the call circuit is not in use, spell the number deliberately to the "B" operator, who will assign the trunk without repeating the number for check. The name of the calling office is not passed over the circuit except in cases where two or more offices reach the same "B" operator over the same call circuit.

If, while passing a call, another operator should break in on the circuit do not create confusion by attempting to force your call through, but wait until the second operator has secured her assignment and then repeat the call.

¶ In passing numbers over the call circuit it is good practice to spell the number—*i. e.*, call each unit separately as "four, nine, eight, five" for 4985 for the sake of uniformity with local operating and to lessen the liability to error.

¶ In some offices it is customary for the "B" operator to repeat the called number to the "A" operator, assigning the trunk number after it. Where trunking has reached a high state of efficiency it is not necessary nor desirable to repeat the number as it greatly reduces the efficiency of the calling circuits. As the amount of business handled by a "B" operator is dependent on the number of calls which can be passed over the calling circuit it is manifestly undesirable to use any superfluous words.

¶ When there are not enough trunks incoming from one office to make a load for one "B" operator and when business is slack during nights and on Sundays and holidays it is sometimes desirable to have one "B" operator put up trunks from two or more offices. In such a case it is necessary for the "A" operators calling on this circuit to repeat the name of their office in order that the "B" operator may select a trunk from the proper group. In order that the "A" operators may remember to call their office name on these "split" call circuits some offices have used to advantage a button with a concave top, the feeling of which reminds the operator to call her office name.

(d) While passing the call, take up the front plug of the pair selected and carry it toward the group of trunks that terminate in the desired office. Upon receipt of the trunk assignment release the call circuit button and open the listening key so as to be able to test the trunk assigned before plugging into the jack. If the jack is found to be busy, go in on the call circuit and say, *"Two, three busy—seven, eight, nine,"* supposing 23 to be the trunk assigned and 789 the number called.

EDITOR'S NOTE.—This is an actual set of working instructions for a traffic department. Supplementary notes inserted for the information of telephone men who are not operating experts, or to explain doubtful points, but not properly included in the actual working copy, are contained in paragraphs preceded by the sign (¶). Begun in the issue of November 16.

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¶ The matter of testing a call circuit trunk jack before taking the assignment is another point on which opinion seems to be divided. Where trunking has reached a high state of efficiency it has been found unnecessary. In other cases it is thought to be justifiable as the practice is intended to prevent error in taking up the assignment.

(e) Watch the front cord light for the "busy back" or "trouble back" signal, which will be put on by the "B" operator in case the number called is either "busy" or "out of order." Upon receipt of either of these signals notify the calling subscriber the same as on a local connection. On calls to small offices not equipped for sending the "trouble back" or "busy back" signals this report will be given direct to the subscriber by the distant office.

¶ Shortly after trunk operating became a necessity it was found that the "A" operator could not wait on the call circuit while the "B" operator tested the jack before assigning the trunk, so it was found desirable to assign the trunk and then test the line afterwards. As the "B" operator could not speak on the trunk to advise the calling subscribers or operator of the fact it became necessary to resort to some other means of handling calls for lines found to be busy or out of order. The "B" operators soon found a way to talk on the trunk by touching one contact of the trunk plug on the other contact of any idle trunk, thus establishing a circuit to their head telephones, enabling them to talk to the distant subscriber. This practice was obviously bad for more than one reason. It is here mentioned to show that operators will find out things about circuits which the designer never dreamed of. The first arrangement for caring for these conditions was to put the calls on the supervisor who advised the distant subscriber of the condition, but it was soon found desirable to replace this method by an automatic arrangement which would accomplish the same results. The most natural arrangement was to substitute a phonograph arranged to continuously repeat "the line is busy" into a transmitter, the circuit of which was wired to a strip of special jacks in the trunk position marked "busy back." This novel arrangement soon got into bad repute, as the distant subscriber would attempt to talk back to it, of course without result. This was the source of so much complaint that an interrupted hum was substituted and this served the purpose well after the subscribers learned the meaning of it. The better scheme is to have a simple interrupted ground which will flash the supervisory lamp in the distant office. The "A" operator, seeing the flash, will advise the subscriber in the regular way.

(f) In some offices the "A" operator rings over the trunk and in others the "B" operator does the ringing. In either case the front cord light will go out when the called subscriber answers. In districts where the ringing is done by the "B" operator her ringing should be relied on and requests for "ring again" should not be made in less than one minute from the time of making the connection. When it becomes necessary to request another ring, listen on the call circuit and then say, *"Ring two, three."* When the call is for a number carrying a ring number or letter say, *"Ring two on two, three"* or *"Ring J on two, three."*

(To be Continued.)

CHARGES FOR REMOVALS AND BREAKAGE OF TELEPHONE APPARATUS DUE TO NEGLIGENCE.

IN connection with the question of charging telephone subscribers for the removal of instruments to new locations, a discussion of which has been carried on to a certain extent in our columns recently, an interesting statement has been received from Mr. R. M. Eaton, telling how he handles these matters in the exchanges of the Niagara Home Telephone Company, with headquarters at Niagara Falls, N. Y.

This company has for some time been in the habit of allowing subscribers one move in the year free of charge, but such a move order constitutes, upon its completion, a renewal of the contract for service for one year from the date of removal. Mr. Eaton expects, however, to change this plan soon, and issue a general order insisting upon subscribers paying for all moves. The charge is to be made as near to the actual cost of removal as possible. No attempt will be made to figure the cost of removal, however, on each particular job, but the subscriber will be billed an amount based upon an average for the particular class of removal made necessary. That is to say, the move orders will be classified, and a stated amount will be charged for each kind of a move order, so that a subscriber will know in advance just what he will be compelled to pay.

This company has found it necessary to go a step farther than many companies even in the matter of renewal of parts broken through apparent negligence. For some time past it has insisted that its subscribers shall pay and has collected charges for broken receiver shells, mouthpieces, or any part of a telephone broken as the result of an accident involving negligence on the part of the subscriber or his agents. An illustration of the circumstances calling for such a charge which may be cited is that of a subscriber who knocks his desk stand telephone from the desk and breaks the stand, or any part of it. For each of the small parts there are regular set prices charged; as, for a transmitter mouthpiece, 25 cents; receiver shell, 50 cents, etc. This amount, whatever it may be, is added to the monthly bill following the replacement of the broken apparatus.

The company has felt this charge to be necessary on account of the large percentage of desk stands now being used, which makes accidental breakage much higher per telephone than it formerly was. Since this plan has been inaugurated no serious complaints have been received, and all accounts, with one exception, have been promptly paid. The instrument was taken out in the case of the subscriber who refused to pay, and it is understood among the patrons of the company that refusal to pay these charges will result in the service being discontinued, just the same as if they refused to pay regular rental or toll bills.

The Availability of Tantalum Lamps for Ringing Lead Resistances

By Arthur F. Poole.

RESISTANCE is inserted in the generator supply leads to each operator's position in a telephone exchange in order to provide against troubles which, if there were no resistance, would result from ringing on a short circuited and sometimes on a grounded line. These line faults, if brought, on the operation of a ringing key, into direct connection with the generator through no higher resistance than that found in the cord and associated wiring would put on the machine what would practically amount to a temporary short circuit. The low resistance path thus provided would be followed by nearly all the ringing current, leaving none available for use at other operators' positions. Thus, when an operator rung on one faulty line she would make it impossible to call any subscriber in the exchange until she had finished.

It is a common practice to insert between the mains from the generator and the ringing keys at each position a carbon filament lamp. Such lamps, however, have the disadvantage of introducing a much larger resistance into the line when the operator is ringing on a normal line, where no protection is needed, than when needed to protect the generator at such times

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as it is connected to a short or grounded circuit. Their resistance varies the wrong way. Instead of being least when the current is least, corresponding to the case of ringing on a normal line, and increasing as the current increases, corresponding to the case of ringing on a short line, the reverse is true. A 16-candle power 110-volt lamp has a resistance of from 400 to 500 ohms when a current of from 10 to 20 milliamperes is passing through it. This resistance drops to about 200 ohms when the current increases to about 500 milliamperes. The change, primarily due to the variation in resistance with the temperature of the filament, which falls with the increase of current, is shown in the curve marked "carbon" in Fig. 1. Current strength in milliamperes is plotted on the vertical scale and resistance in ohms on the horizontal one.

When the new tantalum filament lamps came on the market it seemed that the positive temperature coefficient of the metal would make them more suitable for these resistances than carbon. A curve (marked tantalum) of the tantalum lamp is given in Fig. 1. It will be seen that under ordinary ringing conditions the resistance of the lamp is about 80 to 100 ohms. As the current increases the resistance also increases and the lamp with 110 volts across its terminals allows but 350 milliamperes to pass instead of 500 as is the case with the carbon lamp.

In Fig. 2 are plotted two curves showing the voltage drop in the carbon and tantalum resistances at various current strengths. No special care was taken to get these values exact since only approximate results were sought for, so the curves are not very

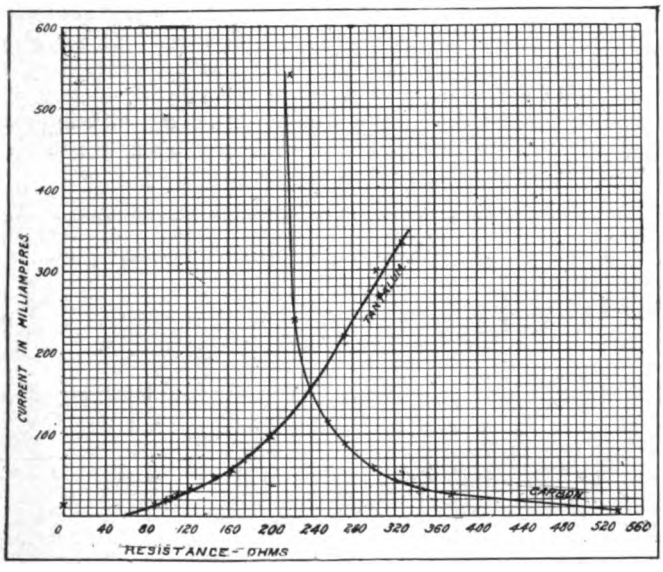

Fig. 1. Curves showing variation in resistance of carbon and tantalum lamp filaments at different current values.

accurate. However, they show a smaller voltage drop for the tantalum lamp in the case of small current and a greater drop in the case of a large one than the carbon lamp.

The tantalum lamp used for plotting these curves is the ordinary commercial 40-watt 110-volt lamp. The resistance of this is greater than it need be, since the tantalum filament will stand a voltage of 160 to 170 without burning out. It would seem, however, that the expense and trouble of getting a special lamp made is not compensated for by the increased efficiency which might be obtained.

When these lamps are used on a harmonic pole changer one might think that the high voltage used on those machines would burn the lamp out in case of a dead short circuit. This, however, is not borne out in practice, since under the load of one lamp the voltage will drop to 60 to 80 volts, as has been the writer's experience with a couple of pole changers on which the experiment was tried. At the same time the load is not great enough to produce injurious sparking.

The laboratory circuit arrangement for securing data for plotting the curves accompanying this article is shown in Fig. 3. Energy for lighting the lamps was furnished from a string of dry cells, regulation being obtained by the adjustable resistance.

SIXTH OHIO DISTRICT ASSOCIATION MEETING.

ONE of the best meetings ever held by members of any district of the Ohio Independent Telephone Association was that of the sixth district held December 6 in Dayton.

In the absence of the vice-president of the district, J. H. Thedieck, of Sidney, President Frank L. Beam, of the State

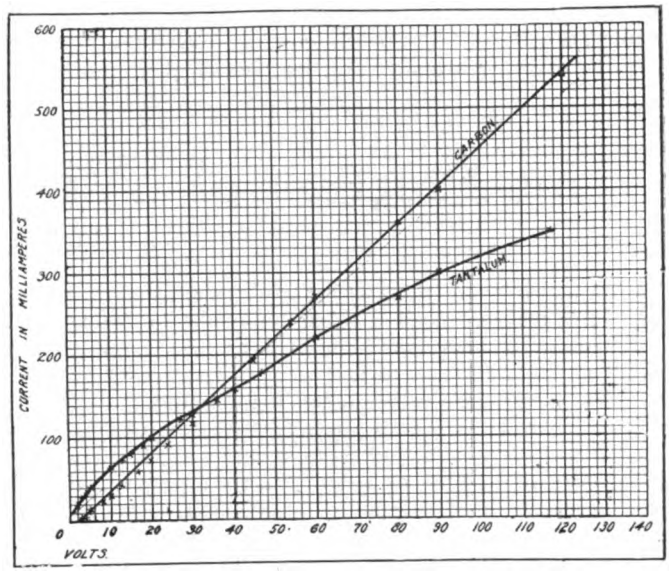

Fig. 2. Curves showing voltage drop through tantalum and carbon filaments for different current values.

association, opened the meeting. J. H. Ainsworth, general manager of the Dayton Home Telephone Co., was elected chairman, and C. R. Bleakney, of the Sidney Telephone Company, secretary of the convention. This organization was later made permanent by the election of Mr. Ainesworth vice-president of the district, and Mr. Bleakney secretary.

The business of the session included reports from the representatives of the various Independent companies of the district, which comprises nine counties—Montgomery, Darke, Miami, Champaigne, Clark, Madison, Warren, Logan and Butler. The Independent companies are operating 89 exchanges, 219 toll stations, with 1,525 circuit miles of line, have 1,819 stockholders and are using 38,621 telephones. Comparison showed that in the same area the Bell interests were

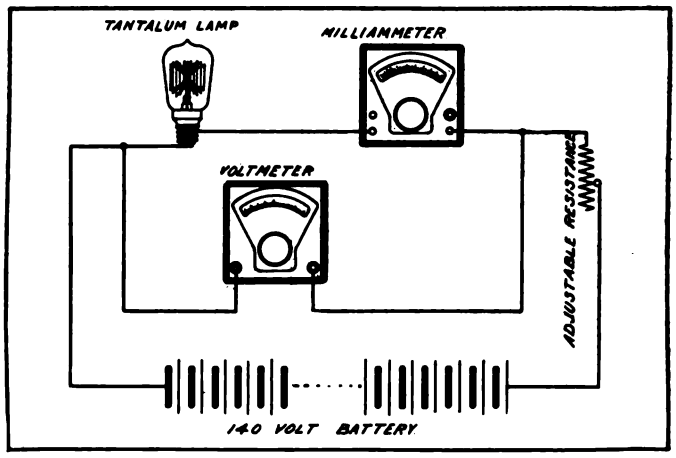

Fig. 3. Circuit used for taking measurements used to obtain data points from which curves in Figs. 1 and 2 were plotted.

operating 32 exchanges, 105 toll stations and about 17,158 telephones, and that there were no known stockholders.

A nominating committee, consisting of Messrs. S. W. Rinehart, of Brookville, D. O'Dell, Springfield, and C. E. Yoder, Bellefontaine, were appointed to place nomination delegates and alternates to the national convention and to the Ohio State Convention. The delegate to the international

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convention at Chicago is J. H. Thedieck, of Sidney, with W. W. Fisher, of Bellefontaine, alternate.

President James S. Brailey, of the United States Telephone Company, read a set of resolutions passed at the last session of the board of directors of the company, in which the absolute loyalty of the company was pledged to the Independent telephone movement.

Addresses were made by President Frank L. Beam, of the Ohio Independent Telephone Association, who told facts about the work of the association and showed the marvelous growth of the movement and its present thrifty condition; Hon. Cyrus W. Huling, of Columbus, counsel of the association, and of the Columbus Citizens' Telephone Company; W. Gilbert Thompson, of Hamilton; Col. Rush, of Greenville, and John T. Barlow, president of the Dayton Home Telephone Company, spoke to the members. Col. Rush detailed the fight, in which he brought the number of Independent telephones in service up to 6,350 in Darke county and brought the number of Bell telephones down to 42. Mr. Thompson, who is vice-president of the fifth district, made a report of the condition of affairs in his territory. Mr. C. L. Norton also gave an interesting talk.

The Progress of Wireless Telephony in Europe

By J. B. van Brussell.

THE possibility of transmitting intelligence by electric waves, and the success of wireless telegraphy in this field, has long kept awake the hope of a practicable realization of wireless telephony. But so long as the violent jerky spark was the only source of electric waves, the fulfillment of the hope was unthinkable. The wave diagram at the top of Fig. 1 indicates how a short-lived spark is followed by a long pause before the next spark produces its sudden and quickly-dying wave-train. For telegraphy this suffices perfectly; each short wave-train produces a tick in the telephone, and with 20 to 30 sparks per second the ear perceives a continued rattling tone, amid which the dots and dashes of the Morse alphabet are easily perceived. By having a sufficiently high spark frequency, however, Prof. Fessenden succeeded some time ago in transmitting wireless telephonic messages fairly well, in spite of the interference of the noises produced by the sparks.

In wireless telephony the need is for something analogous to a steady line current of the common battery line used in ordinary telephony, on which the speech vibrations can be impressed. This something is, perforce, a continuous band of quick waves to which the receiving station can be tuned. On this band the sound waves then cut a profile embodying their peculiarities, and the receiver is thus caused to resound in rhythm with the sound vibrations which are impressed on the transmitter. Such a band of high frequency waves can now be produced. The history of the method begins with Elihu Thompson, and was also investigated by Duddell, who in 1900 found that under certain conditions electrical oscillations arise in a capacity inductance circuit arranged as a shunt to a continuous current carbon arc. The oscillations so produced were not of sufficiently high frequency for wireless transmission, though Simon claimed in 1903 to have produced very high frequencies. The Danish physicist, Poulsen, was the first man in Europe, after this theoretical preparation of the ground, to find a practical form of arc lamp for the production of short waves. He caused the arc to burn in an atmosphere of hydrogen, and in a strong magnetic field, and with large currents he used cooled electrodes at the arc. The same end was attained by the German Gesellschaft für Drahtlose Telegraphie, as it claims, in a better practical form, and without the use of hydrogen or of a magnetic field. It employs what is essentially a multiple sub-divided arc lamp, each arc occurring between cooled electrodes.

Part of the lamp is shown in Fig. 2. The positive electrode is of copper, the negative of carbon. In order to obtain the best possible cooling of the electrodes of the arc the copper electrode, *B*, is formed of a tube which can be kept filled with water. The carbon electrode, *A*, projects toward, and is included by, the hollow surface of the copper electrode. The carbon is solid, of 30 mm. diameter, and the copper tube has a diameter of 45 mm. The complete oscillation-generating lamp consists of a series of these elements. Six are used in series on a 220-volt supply, and twelve on a 440-volt service. The regulation is wonderfully simple. Each pair of electrodes can be brought together independently of the others. When all of the series have been brought together, both sets of electrodes are held together by the pressure of a lever, so that they can all be drawn apart simultaneously to the same amount by the action of a single screw. When once this distance has been adjusted it is only necessary in order to strike the arc to switch on the current and press the lever, which closes all the gaps for a moment, and then opens them again to the original distance. Further regulation of the carbon is unnecessary, since the rate of burning of the carbon is very trifling (1 cm. of carbon in about 300 hours of burning), and the carbon, by its burning, shapes itself into the proper form. Once set up, the lamp can burn for hours without the slightest attention. The filling up, every 8 or 10 hours, with a few litres of water, is the only thing necessary for continued service. On the other hand, the difficulties of keeping steady the Duddell arc, as used by Poulsen, in hydrogen with a magnetic field are well known.

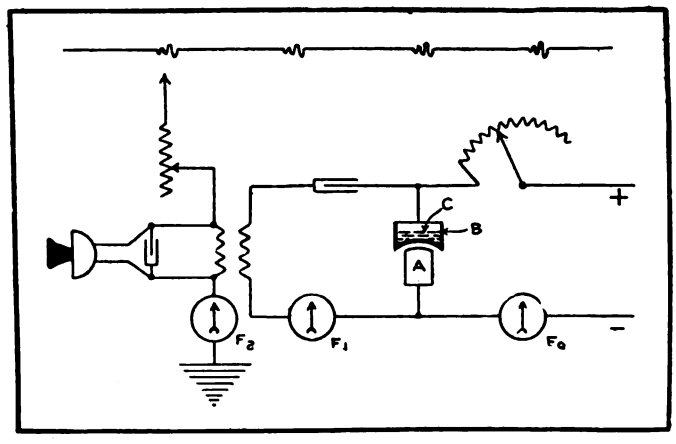

Fig. 1. Upptr diagram shows character of wave used in wireless telegraphy, not suitable for transmitting speech. Lower diagram gives elements of transmitting circuit for wireless telephony.

The compound lamp described above is inserted in an oscillation circuit which is coupled with the antenna, and a microphonic transmitter is arranged in parallel with the transformer winding (Fig. 1). It is clear that in accordance with the alterations of the resistance of the transmitter there will be variations of the coupling and of the tuning of both circuits, and correspondingly of the energy output from the antenna. In other words, the amplitude of the continuous series of electric oscillations rises and falls to the same extent as the resistance of the transmitter varies through the incidence of sound waves. In Fig. 1, F_0 is a hot wire ammeter, included in the antenna circuit; on this instrument it is easy to see how the output of radiation from the antenna is affected by speaking into the transmitter.

The receiving arrangements are very simple. In Fig. 2 is shown a variable self-induction, by means of which the antenna can be attuned to the incoming waves. The detector and the telephone, in series with it, are placed in shunt across the inductance. The detector may be an electrolytic cell or a thermo-

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detector. A switch for changing the antenna connections to and from the sending and the receiving circuits completes the equipment. The whole apparatus can be accommodated on a table less than a yard square. The table may have a vertical

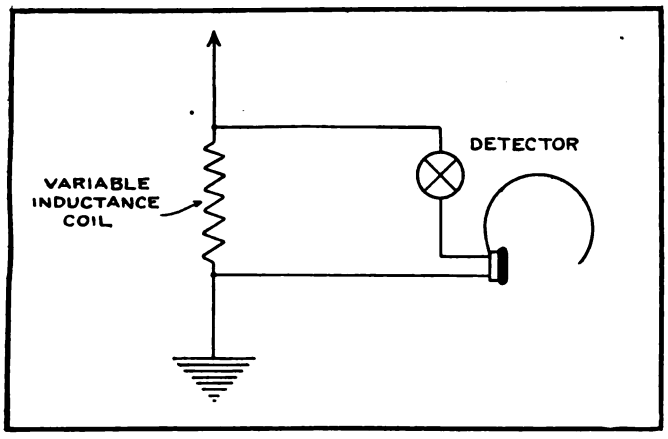

Fig. 2. Elements of receiving circuit for wireless telephone messages, said to be used by "Die Gesellschaft für Drahtlose Telegraphie."

backboard, which can carry the continuous current ammeter, F_0, and both alternate current ammeters, F_1 and F_2, above the level of the table, and the regulating resistance can be placed under the table. On the table are two sets of six sending lamps in series, one or both of which may be used according as 220 volts or 440 volts are available. The switch changing over from "speaking" to "hearing" is put between the lamps, and behind it is the transmitter with its trumpet, the inductance and condenser of the sending circuit, and the coupling and lengthening coils for the air wires. On the left of the table are the detector, the telephone and the variable inductance for receiving. A switch on the right turns on the continuous current, and a touch of the arc regulating lever strikes the arcs. For "speaking," the central switch connects the air wire with the coupling coil. For "hearing," all that is necessary is to turn over the central switch.

Speech is said to be clear, and all the vowels and consonants are obtained equally loud if the coupling is loose and the tuning of the antenna sharp. Any other disposition allows "a" and "o," which on account of their wave form are very suitable for transmission, to be transmitted loudly, while "i" and "u" are transmitted very softly. Speech then becomes, even if loud, indistinct and broken. Since these lamps with a number of arcs produce oscillations of constant energy, the transmitted speech is free from telephonic noises, such as are caused by rapid variations in the energy. With a single arc, used with or without air blast or magnetic blow-out, it is impossible to produce such a uniform energy output.

Spark telegraph stations working with waves of the same length as those employed at a telephone station can seriously disturb the latter only when the telegraph station is very powerful or very near. One can usually distinguished the speech sounds upon which the Morse signs are superposed. For example, a 200 kilometre spark telegraph station with a 40 metre mast painfully disturbed a telephone station 5 kilometres away because the telegraph station was sending quickly with the same wave length. By removal to a distance of 20 kilometres it was possible to receive speech correctly with 10 kilometres between the telephone stations.

As simultaneous hearing and speaking are not possible, and since the listener cannot ask for a repetition when he has not heard distinctly, it is advisable for the sender to take special care to speak clearly, and every now and then to turn the switch over to "receiving" and ask if he is understood before proceeding.

A station such as that here described is in use in the Technical High School at Charlottenburg, and corresponds with a similar but portable military station up to distances of more than 30 kilometres. The portable station has an umbrella antenna and a balancing capacity, with a mast 20 metres high. At Charlottenburg a T antenna of three parallel wires 50 metres long, separated about a metre, is used. The height of the antenna is still smaller, one mast being 13 metres and the other 10 metres high. The water pipes serve as an earth. The antenna has a natural wave length of 400 metres, which can be lengthened to 800 metres. The continuous current is supplied at 220 volts, and six arcs are used in series. The energy output is 800 watts (3.6 amperes at 220 volts).

At distances of 10 kilometres the loudness of the received speech is such that to hear every word distinctly it is not at all necessary to press the telephone against the ear. The stations were opened by the German Emperor in April.

It is reported that a station with 440 volts, and, correspondingly, 12 arcs, using power at the rate of 2 kilowatts, easily transmits speech to 40 kilometres distance with a mast 30 metres high and an umbrella antenna. It is known also that with the lamp sender described, the energy dispatched as radiation increases with the voltage of supply, and the number of arcs. A practical limit, however, is imposed by the properties of the early form of transmitter. Still, we may shortly expect to have at our disposal a microphone which will allow far higher claims to be made than the older instrument permits. Then, without other improvement, we shall be in the position of speaking without wires over distances beyond 100 kilometres. The writer wishes to express his indebtedness for facts embodied in this article to C. Shapira and S. Löwe, of the Gesellschaft für Drahtlose Telegraphie.

KANSAS CONVENTION SHOWS THE DETERMINATION OF MEMBERS TO CONTINUE VIGOROUS COMPETITION WITH BELL COMPANIES.

MATTERS relating to competition were among the principal topics discussed at the meeting of the Independent Telephone Association of Kansas recently held at Topeka, Kansas.

It appears that the Bell company was, to a considerable extent, responsible for the unusual energy of expressions along this line, owing to its misdirected overtures. One of the first actions of the convention was to request a representative of the Western Electric Company, manufacturers of Bell apparatus, to withdraw from the meeting.

Statistical returns and statements of local conditions from the operating companies in the State indicated that business has grown rapidly, and is in general on a very firm basis. At the present time there are over two hundred Independent companies in Kansas, and their ownership is vested in not far from 25,000 holders of stocks and bonds, who are residents of the State and users of the service provided by the plants which they own. It was made clear at this meeting that there has been practically no change in the situation, so far as local ownership is concerned, nearly every plant in the State being still owned by people who are residents of the community in which it operates. Usually the principal ownership of each company is divided between a number of stockholders, varying from six to fifty.

Considerable progress was made toward getting together on a system of bookkeeping which will enable the members to more economically and justly handle the distribution of toll earnings. One of the features of the meeting, which was not without its amusing side, was the presentation of an offer by the Bell company to permit the delegates to the convention to use the Bell toll lines free of charge during the meeting. The humor of the situation was somewhat tempered by the recollection of the character of the Bell company's opposition to these same companies before they had arrived at their present strength, however, and accordingly the following resolution was passed:

WHEREAS, This convention has been tendered the free use of the toll lines of the Bell company while we are meeting in the city, and

WHEREAS, the Independent toll lines now thoroughly cover territory much larger than the territory covered by the Bell lines, and

WHEREAS, This generosity on the part of the Bell company is thought to be intended to influence this convention to act favorably on their application for membership which we understand they are about to file,

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THEREFORE BE IT RESOLVED, That inasmuch as in former years, before the Independent toll lines were developed, when such generosity on the part of the Bell company would have been of real value to us and was not tendered, that we do not avail ourselves of their generosity on this late day.

The convention also passed a resolution relating to the purchase of equipment as follows:

RESOLVED, That we, the members of the Kansas Independent Telephone Association, approve of the resolution passed by the International Telephone Association at Chicago last June placing Bell owned and Bell controlled manufactories and supply houses on the unfair list, and that we urge all Independent operators to purchase apparatus and supplies from only such companies as have stood by us in our fight against the common enemy.

In the final business session W. H. Nelson, of Smith Center, was re-elected president of the association, and A. B. Clarke, of Lawrence secretary and treasurer. Mr. W. P. Hemphill, of Topeka, who has in the past served the association so well as secretary, declined to serve again, much to the regret of many members of the association, which has thoroughly appreciated the value of his services. The president and secretary were chosen delegates to attend the National Convention at Chicago. New members elected are J. M. Stratton, of Clay Center, and E. M. Clark, of Pomona. The matter of improvements in the methods of bookkeeping and general business systems is in the hands of a committee composed of H. J. Campbell, of Wichita; C. L. Brown, of Abilene, and Frank Dougherty, of Concordia.

One of the addresses at this meeting, from which the members derived the most benefit, was an interesting talk by J. F. Barnett, well known to Independent telephone men throughout the middle west, and now handling special work for the Nebraska Association. He took up many of the reasons why the Independent companies owe so much of their strength to their organizations, and the close relations existing between the state and International associations.

Merits of and Necessity for New Apparatus*

By Fred Coulson.

ALL apparatus must necessarily have merit, but it is left for the purchaser to decide which particular apparatus is entitled to highest rank. Many things must be considered in making a selection, for a full line of apparatus should be classified under at least four separate heads, viz.: local battery telephones, common battery telephones, local battery switchboards and common battery switchboards. From each of these four one may continue to analyze the apparatus offered, and in so doing the manager will very probably find that all of the manufacturers who are competing for his business have some particular claim for merit on one or more of the sub-divisions that go to make up an entire equipment.

Relative to the necessity for new apparatus, one can easily see for himself that in many instances it is a necessity, and not bought, while in many others it is not a necessity, and is bought. Too many operators are disposed to allow their plant to run down, lines, telephones, switchboards and all, then buy a new switchboard and expect everything to be 100 per cent. good. If they will but look after their maintenance they will not have to buy so many switchboards. On the other hand, when one must buy a switchboard for any reason, if the maintenance has been properly cared for, the service will be first class. The writer recalls a case where the entire outside plant was rebuilt in an excellent manner, and the company expected to buy a new switchboard and everything would be in fine shape. It overlooked the fact that its protection was of the poorest kind, really dangerous from the fact that it might easily cause a fire or allow current enough to pass through to injure or even kill an operator, and at the same time was the source of much cross talk. Now the protector manufacturers have kept abreast with the manufacturers of the other necessary equipment, and there is no good reason at this day for a company not providing reliable and efficient protection.

One of the directors happened to be an attorney, and while he did not understand the terms cross talk and efficiency, he did understand what damages meant, and the protection was bought forthwith when the matter was explained. The result with this company is that its plant is uniformly high grade.

Some operators build the very finest toll lines, using the utmost care in every detail, yet in their exchange they let matters run too easy. Now, when a subscriber is connected with a toll line his line becomes a part of the toll line for the time being, so why should it not be as well constructed and maintained.

Most operating men and owners have gained their knowledge of the business by actual experience, and at their own expense. Some of the younger men gained a part of their knowledge of the business from the experience of some one else, and those who have made the most of such advantages have seen that the field was so large that they have felt disposed to specialize. Hence in the large companies one will find young men in charge of various departments, such as maintenance, construction, engineering and operating, and each fully versed in his particular field. Men in the smaller companies have become familiar with all branches of the business only in a general way, and the time is here when state associations must have an organization of the same general character as the large companies, so that their members may avail themselves of the knowledge of these specialists.

Thus they would soon have standard construction, maintenance, and operating, and the benefits gained by such a plan would be of untold value to them. Who has not, after careful study and much figuring, strung a 50 or 100 pair cable in some direction, and within a year found it was inadequate or was on a wrong route to care for his distribution economically. One may seek the aid of his supply men in making his plans for such extensions, and often the aid of his neighbor operator, in whom he has confidence. They work honestly with him, and for him, yet he later sees a mistake that probably costs him several hundred dollars, and he almost despairs of ever getting through spending money for reconstruction. Is it not a fact that a great part of the expense which in the last few years he has been charging to construction should have been charged to reconstruction?

There are engineers of ability who are specialists in so far that they have perfected themselves in one particular branch of the work, so that they can foresee these things, and provide plans and specifications so that one may at once know what his expenditures will be on the plant and what the returns on such an investment will be.

Nearly every manager looks forward to the day when his stockholders are to get a little dividend. Perhaps he means to surprise them that he can pay it so easily, but before that happy day arrives he discovers that it is necessary to string some more cable, and the dividend goes glimmering. To make money from the plant get a specialist to do the planning. Many companies are working too many men, also too many operators, and not getting proper results from either. What they need is the service of a specialist to improve their operating and a specialist to improve their maintenance and get better results from both departments with probably a substantial reduction on pay rolls. They will not feel the necessity for new equipment so soon, and when they do change equipment the plant will then be 100 per cent. good.

This argument, which may at first thought seem to be against the purchase of new equipment, is really for new equipment, for

*Abstract from an address delivered at the Convention of the Kansas Independent Telephone Association.

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the saving made by the work of the specialists will put money in the treasury, and a company will be disposed to gradually work out its old apparatus and replace it with the best obtainable, whereas at the present time it may be patching it up, and buying as little as it can.

In many places an advance in rates is not needed as much as curtailment in expense of operating, maintenance and reconstruction.

THE MARION CASE IN THE OHIO COURTS.

ON November 16 last, the Ohio Independent Telephone Association, by its attorneys, Cyrus Huling and G. P. Thorp, filed with Attorney General Ellis of Ohio a petition requesting that quo warranto suit be brought in the Supreme Court of Ohio against the Central Union Telephone Company of Indianapolis and the Marion County Telephone Company of Marion, Ohio, to the end that they might be ousted of their franchise rights in Ohio on account of a deal made by those companies about September 30, 1907, whereby the Marion County Telephone Company took over local exchange plants and equipment of the Central Union Telephone Company in the city of Marion and in certain other localities in Marion County, a part of the consideration being that the Central Union Company install and operate in the exchange of the Marion company a new toll-board to which were to be connected Bell toll circuits. Pursuant to the agreement, the Marion company was to retain the toll connections maintained by the United States Independent Long Distance Telephone Company of Cleveland, which had been operating in the Marion County field. On October first the Central Union Company cut over to the new toll-board all of its toll circuits and also to this board connected up the toll circuits of the United States company, without that company's consent.

The United States company, having found this condition of affairs detrimental to their interest, on November 19, severed all their connections with the Marion company, in which action they have had the approval and support of the Ohio Association. The United States company then established a toll station in other quarters. The evident aim of the combination by the Central Union and Marion companies, so far as themselves were concerned, was the total elimination of competitive telephone service in Marion County; and the arrangement brought as a result a considerable diminution in the income from toll service to the United States company. The continuance of similar arrangements at the instigation of Bell interests would inevitably cripple the United States company generally in its service throughout its territory, and, ultimately, eliminate competition in long-distance service and place at the mercy of the Bell trust Independent exchanges throughout the state. The combination was alleged by the association to have violated common law, certain revised statutes of Ohio, which classify telephone, telegraph, and railroad companies as common carriers and prohibit their combination, and the Valentine Anti-Trust law, and through such violation properly subject to the penalty of loss of franchise rights. The chief defense of the Bell people is that the laws cited do not apply to telephone companies, and that they have been so fair and generous in their treatment of Independent companies that there is no ground for just complaint. The attorney general agreed to hear arguments in the case and on December 12 a hearing was held in his office. The Ohio Association was represented by Attorneys Huling, Thorp, and W. L. Carey, the Bell interests by Attorneys W. B. Mann and David K. Tone. The attorney general decided that he will not in this case bring action looking toward forfeiture of the company's charters, as provided for in the Valentine anti-trust law, but will test the legality of this particular merger between the Central Union and Marion companies by a suit to have it annulled. The following is quoted from the attorney general's decision:

"The question presented is involved in considerable doubt. It may be that the contract complained of does not contravene the law or public policy of Ohio, but the consequences that would follow the general absorption of the long-distance business by the so-called Bell company and the destruction of all competition in Ohio, a result that might easily be predicted if similar contracts to that in effect in Marion County were made throughout the state, are so far-reaching as to make advisable an early determination of the lawfulness of such agreement. It is especially important to the telephone interests of the state, including not only the companies complaining, but those complained against, that their respective rights in the question raised by this controversy should be definitely ascertained."

Present at the hearing were Frank L. Beam, Dwight E. Sapp, James S. Brailey, Jr., and C. Y. McVey, representing Independent interests; L. G. Richardson, president of the Central Union Telephone Company, T. P. Sylvan and E. A. Reed of that company; and D. R. Crissinger and F. K. Guthry of the Marion company. Telephone men throughout the state feel greatly interested in the coming trial of this case. Officials of the Independent Telephone Association and its attorneys express the belief that the Supreme Court will render a decision favorable to the Independent interests.

THE MARYLAND TELEPHONE COMPANY OF BALTIMORE UNDER NEW CONTROL.

FOR the past two weeks the people of Baltimore, and Independent telephone men in the vicinity, have been wondering whether active and genuine competition between the telephone systems in the city of Baltimore is to continue. Announcement was made of the sale of the company to persons represented by H. P. Miller, said to be of Columbus, O.; Joseph Taylor and F. M. Twomey, said to come from New York City, and Dudley G. Browning, of New Jersey. In view of the fact that Joseph Taylor, previous to coming to Baltimore, had been manager of the Massachusetts Telephone Company, which originally operated an Independent plant in Boston, but has for some years been owned by the Bell company, there has been no lack of conjecture that the Baltimore company is to be henceforth under the control of Bell interests. Up to the present time, however, Mr. Miller, who is in active charge of the system, has continued to protest that the company would continue to be Independent in the most absolute sense, and would form connections with neighboring Independent systems, although no definite arrangements for such connection have as yet been made.

LORD KELVIN DEAD.

SIR WILLIAM THOMSON, Lord Kelvin, died at Glasgow on December 17. Scientific men the world over will mourn his loss as that of a man whose keen intellect and vigorous talent for investigation have been productive of many of the most important advances in scientific work which have occurred during his lifetime. Born at Belfast in 1824, he showed in his youth the highest aptitude for mathematical work and scientific investigation and was able to profit greatly by the skillful teaching of his father, James Thomson, professor of mathematics at Glasgow University. He won honors during his university career at Glasgow and Cambridge and gave evidence of the ability which he afterward made so useful by application to technical problems of industrial importance.

Perhaps his first work which brought general recognition was that done during the time he was electrician for the Atlantic cables, when he invented the mirror galvanometer and the siphon recorder used in connection with submarine telegraphy. His abilities were exerted to a very considerable extent in connection with the problems of submarine telegraphy and the successful operation of the cables was largely made possible as a result of his work. He invented during his life many electrical measuring instruments and instruments for use at sea and has done much extremely valuable work in connection with the introduction of exact methods of dealing with physical quantities. At the age of twenty-two years he was appointed professor of mathematics at Glasgow University and held this position until his resignation in 1899. His contributions to leading scientific journals and the proceedings of scientific societies were almost innumerable and have been the basis of important development work and much valuable instruction in the arts in which he was interested.

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By the Editor

LEARNING CIRCUITS.

IT is safe to say that most of the men who are in active charge of telephone systems, or anywhere near the head of operating, maintenance, and not infrequently of construction departments, have had at one time or another to acquire the ability to read telephone circuits. In fact, it would be hard for a man who has anything to do with central offices in the way of design, operation, or the intelligent purchase of apparatus, to make a success of his work without at least the ability to trace from a blue print at first sight the working of circuits which are not extremely complicated. Young telephone men, and the older men whose experience has broadened with the growth of their business until they find themselves dealing with new circuit problems relating to the equipment of local lines for common battery central offices, trunk and toll lines, and private branch exchanges, find that it pays to develop some kind of a system for the study of blue prints.

In working out such a system, unless they can profit by the constant advice of more experienced men, they often find themselves pursuing false leads, which result in a considerable loss of time. In other words, they spend a great deal more time studying any given problem than they need to do, because they are unable to so direct their studies that each point learned becomes firmly fixed in their minds, and forms some part of a natural sequence which makes it easier to learn the next thing.

The experience of men who have had much practice in this sort of work usually leads them to offer suggestions for the learning of circuits by separating them into their elements. Along this line, perhaps the most natural and easy thing to do in connection with any given circuit is to first make a clear and distinct separation of those parts essential respectively to the talking and signalling functions. Each of these can then be traced out independently. This is possible on even the most simple circuits, as both functions are performed by practically all of them. Once this division is made a still further resolution of each division can be effected. For example, in the circuit from a subscriber's instrument to the central office, when one is considering the transmission of speech it is unnecessary to think of the working of generators or bells on the magneto system, or of the passage of the current which affects the line relay, and causes the illumination of the lamp. All that need be traced out is the passage of current through the primary circuit, then through the secondary, which forms a part of the line.

By separating in the mind these two functions it is possible to trace in detail the working of the circuit, provided one has a very fair knowledge of the most simple principles of electrical and electromagnetic action. In tracing out circuits thus a man acquires familiarity with the working of their various elements. For example, he learns to associate certain combinations of lines in a diagram with the function of repeating alternating current, or finds out how a condenser permits the passage of a ringing current while preventing the free movement of battery current, such as is necessary for the operation of relays. When this point is reached, a man who is familiar with only the actions of the apparatus depending upon its general nature, and not with its dimensions, is likely to find himself occasionally in difficulties. For example, he will find instances where two relays drawn in the same way in a diagram, and having the same resistances, will not operate in the same manner under the influence of an alternating current; or where in one circuit a condenser of a certain capacity will permit the passage of an alternating current for ringing, while in another circuit a condenser of a different capacity is inserted in almost precisely the same manner to prevent the passage of ringing current, while permitting alternating voice currents to go through. This leads to a study of the effects of capacity and inductance upon electric currents. When a man has mastered these points and has a general knowledge of the construction of apparatus he is usually in a position to read at sight most of the blue prints which are set before him.

SHALL WE PUBLISH INITIALS OF INQUIRERS ON OUR QUERY PAGE?

NOTHING can make the department of AMERICAN TELEPHONE JOURNAL devoted to the answering of questions on practical subjects so valuable as the free use of the facilities which it offers by a large proportion of our readers. We have in the past attempted to make our subscribers understand that they may feel perfectly free to send inquiries to be answered in this way whenever the information desired will be useful to them directly, or helpful to any of their associates in the operation of the telephone systems with which they are connected. A letter received this week from a man who has frequently shown his interest in the JOURNAL offers a suggestion which may strike some of our subscribers as being along the line that they would like to see followed in connection with the publication of such answers as are printed in our columns. He says:

"In your issue of Saturday, December 7, you have an article under the heading 'Returns Our Subscribers Might Get for Their Subscription Money' which invites all to send to you for any and all information they may want, and states that you will be very glad to help all in your power. In connection with this I would respectfully suggest that you announce that in future you will abandon the use of names and addresses in publishing answers to inquiries. My reason for suggesting this is that I believe there are a great many men in the telephone business who from a false sense of shame will not admit that there is any proposition in the business that they are unable to solve alone and without aid from any source. These very men would be glad to avail themselves of the help you can give them but for the fact that in assisting them you make public their need of assistance. This does not matter in large cities, but in small communities where all the men in the electrical business know one another it cuts quite a figure; and, as I see it, it is the subscriber or reader in the small out of the way section who really needs your help the most.

"I have experienced difficulty along this line when sending a man on trouble, or to make changes. If asked whether or not he understood the principle and working of certain apparatus the answer was invariably in the affirmative, but frequently later developments showed that he had only the haziest idea of 'how and why.' When I have explained to him that my question as to his knowledge was only that I might show him more plainly what to do, he would admit that he did not understand the apparatus, but feared to admit it. He fancied that as it was his business to know, an admission that he did not would cause ridicule or possible discharge.

"I honestly think that a reader's knowledge of the fact that his questions would be answered and no clue given to his identity would be productive of some very interesting letters."

It has been no unusual thing for inquirers to request that other initials than their own be used in replies to questions, and this practice has been followed. Still other men have occasionally sent questions without signing their names; and, where there was no way of tracing the identity of the writers, these questions have gone into the waste basket. While we can appreciate the reasons which might lead a man to wish to conceal his identity in such a manner occasionally, we refuse to spend time and money to answer the questions of a man who has not confidence enough in us to rely upon our discretion in such a small matter as the publication of his name. Now, this query department is run solely for the benefit of our readers, and, to a considerable extent, for their benefit as individuals, subject to the limitation only that published answers shall relate to matters of more than local interest, all other questions being answered by mail. Under the circumstances there is no reason why the majority should not rule in such a question as the publication of initials. Will our readers tell us what they would like to have done?

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Matters Legal

CONDUCTED BY A. H. McMILLAN.

NO LIABILITY FOR DAMAGE CAUSED BY ACT OF PROVIDENCE.

On the evening of July 9 last, this city experienced a very hard electrical and wind storm, many trees and wires were blow down, and all companies about here suffered greatly.

In one part of the city trees had blown down our wires across the trolley. At a point several blocks from where the wires came in contact with the trolley, the roof of a church was blown off and carried our wires down with it. A driver of an express wagon, in attempting to get his horses out of the storm, drove right in among these hot wires and both his horses were killed, and he, himself, was injured. We will have to defend a suit for personal injuries to him and property damages for the horses.

The point of our defense will be that it was an act of providence and could not have been prevented. If you have anything in your files of similar nature, we would appreciate having a copy of same.

I have gone over your legal column for some time past, and have found two or three articles bearing on it, but thought possibly you might have something on hand that would be of further assistance to us. P. A. H.

IN a case in which a man was injured, in the day time, by driving against a guy wire of a telephone company, which had become loosened and sagged across the street by reason of a storm of snow, rain and sleet, it was held that the court should have allowed the jury to determine the questions of negligence and contributory negligence. The wire had been in the same condition for five days, and the telephone company claimed it was repairing its wires as fast as it could obtain competent workmen. It had no knowledge that this particular wire was down. Friesenham vs. Mich. Tel. Co. 134 Mich. 292, 96, N. W. 501. See also the following cases: S. W. Tel. Co. vs. Robinson 50 F. 810; Cumberland Tel. Co. vs. Hunt, 108 Tenn., 697; Fitch vs. Central N. Y. Tel. Co., 42, N. Y. App. Div. 321; Henning vs. W. U. Tel. Co. 43 F. 131; Gleason vs. Va. & Midland R. Co. 140 U. S. 435, 11 S .C. T. R. 859; Ahern vs. Oregon Tel. Co. 44 Am. and Eng. Corp. Cas. 366; Postal Telg. Cable Co. vs. Zappi 24 S. W. 688.

TEXAS ANTI-PASS LAW DOES NOT FIX RATES.

IN view of the fact that officials of the Southwestern Telegraph & Telephone Company have been indicted at Waco, Texas, and in further view of the fact that many localities in the state have been seeking telephone rate equalization, the latest opinion from the attorney general's department of that state will be read with interest.

The law and its interpretation is thus summarized:

1. The caption of the act prohibits corporations, etc., from discriminating among "persons" in rates and service.

2. Section 1 of the act prohibits the charging of a greater or less fare or rate to one "person" than is charged other "persons."

3. Section 4 of the act prohibits the giving of rebates, etc., or the using of any other device so as to enable the corporation to charge or collect or receive from any "person" a greater or less or different compensation, etc., than it charges or receives from any other "person," etc.

4. Section 7 provides that the offense prohibited is unlawful discrimination in rates, thus indicating that all discrimination was not unlawful under the act, but that the penalties are to be assessed for conviction for such discrimination as is by the act made unlawful, to wit, the discrimination amongst "persons." Nothing is intimated as to discrimination against "localities."

The legislature evidently intended to prevent discrimination as to specific services as applied to "persons"; for instance, the transportation of a person on a railroad, the transportation of a particular species of property on a railroad, the transportation of telegrams and telephone messages, by providing that for these services there should be no discrimination amongst persons.

The opinion thus concludes:

"Therefore, we are constrained to hold that the act does not intend to prevent discrimination as to localities, in so far as telephone companies are concerned, but is aimed only at the prevention of discrimination amongst persons, and so long as all persons are charged the same for similar service there is no violation of the law; that is, telephone companies cannot charge a higher rate for service for one man in a town than it charges any other man in the town for the same service; it cannot charge one man a higher or different rate for long distance service between two towns than it charges any other man; but the act does not prevent a telephone company from maintaining one rate for local service in one town or between two localities, and another rate in another town or between two other localities, although the towns and localities may be similar in size and the service may be under substantially similar circumstances and conditions."

TELEPHONE COMPANY'S RIGHT TO CUT TREES IN STREET.

IN Cartwright vs. Liberty Telephone Co., 103 S. W., 982, the Missouri Supreme Court holds that a telephone company not shown to have been granted a franchise to conduct a telephone business in the city, or authorized to use the city streets, cannot defend an action for mutilating trees growing in a city street on the ground that the erection and maintenance of telephone lines is a proper use of a street, and that trees interfering with that use may be rightfully cut. The court said: "It would not be less startling than it would be novel to hold that the public service corporations have the power, right and authority to mutilate, damage, or destroy the shade and ornamental trees growing upon the streets of our cities, at pleasure without some authority, general or special, granted to them by the city in harmony with and recognizing the rights and interest of the property owners in and to the trees, whatever those rights may be."

RULE REQUIRING CASH DEPOSIT WITH INSTRUMENT TO BE TESTED.

AT Seattle, Washington, Paul Holbrook, an employe of the Osborne-Tremper Abstract Company, has filed a complaint against the Independent Telephone Company to test a new rule requiring a deposit of $2.50 when a telephone is installed.

Mr. Holbrook says that he ordered a telephone placed in his residence, and was told that he would have to deposit $2.50 in cash as security for the safe keeping of the instrument. This he refused to do, and now asks the superior court to order the telephone company to install the telephone without such payment, alleging that the company has no legal right to make any charge to subscribers other than the rental for one month. The franchise granted to John S. McGroarty and George C. Blanker, which was afterward assigned to the Independent Telephone Company, gives no legal warrant for any other than the monthly charge for telephones within three miles of Pioneer Square, according to the complaint.

PLEA OF JURISDICTION OVERRULED AT PADUCAH, KY.

JUDGE WALTER EVANS, in the U. S. court, has overruled the plea of jurisdiction of the city of Paducah against the East Tennessee Telephone Company and directed the city's legal representative to file an answer and complete their pleading within the next 30 days in order that the case may be disposed of.

The city claimed that Judge Evans did not have the right to try the litigation, as he had granted the telephone company a temporary restraining order against the suit of the city, which was filed in the circuit court, asking that the telephone company be compelled to discontinue operation on account of its not having a franchise to operate there. The city has offered for sale at different times a franchise, but the telephone company has refused to buy.

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With the Operating Men

FOURTH DISTRICT INDEPENDENTS IN OHIO DISCUSS METHODS OF IMPROVING THEIR BUSINESS.

INDEPENDENT telephone men from Pickaway, Vinton, Jackson, Scioto, Lawrence, Pike, Adams, Highland, Clinton, Ross and Fayette counties met recently at Washington Court House, O., and had some very interesting discussions on various features of the telephone business. A number of state officials were present, and gave figures and other facts showing the general progress of the Independent telephone movement throughout the state. The members then got down to business and discussed conditions which are such as demand improvement. They talked over the features of individual systems and service which are objected to by subscribers, and discussed means of handling interchanged business more smoothly and profitably.

BELL COMPANY BELIEVED TO HAVE EVADED PURCHASE OF NEW FRANCHISE IN SPOKANE.

COUNSEL for the Pacific Telephone and Telegraph Company (Bell) has addressed a letter to Mayor C. Herbert Moore and the city council of Spokane advising that it will continue to operate after December 14, under a franchise granted to George S. Ladd, of San Francisco, in June, 1884, and expiring June 27, 1914. The Ladd franchise, which has passed through several hands, was signed by James N. Glover, then mayor, and is attested by Charles E. Crellin, clerk. It provides that the holder may use the streets, avenues and alleys in the city for poles or underground conduits for 30 years. The city administration has no record of this franchise ordinance, except the note in the minute books. It was probably copied into an ordinance book, but many city papers and volumes were burned in the fire of 1889, which practically wiped out the business portion of Spokane.

THE SIXTH INDIANA DISTRICT MEETING.

A MEETING of the members of the Indiana Independent Telephone Association for the Sixth District, comprising seven counties in the southwest portion of the State, was held in Terre Haute on the 12th inst., Vice-President J. G. H. Klinger, presiding. Mr. Klinger appointed Jesse W. Weik, president of the Green Castle Telephone Company as secretary. President Klinger said he was gratified at the unusually large attendance and that he had gathered a little statistical data relative to the Sixth District. "Every company in the district is represented in this meeting," he said, "and these companies are now operating 10,785 telephones. The future of the Independents may be safely measured by the progress and development of the past. One year ago," said he, "the Independents and the Bell companies had about an equal number of telephones in operation in Vigo County, including Terre Haute; to-day the Independents have 3,654 and the Bell between 1,800 and 1,900—a net gain of over 100 per cent., while the Bell company has 400 fewer telephones in use in the county than a year ago. In Sullivan County, adjoining on the southwest, the Independents have increased the number of telephones in use to 1,800, while the number of the Bell instruments have been reduced from 300 to 30. In Clay County similar gains and losses are reported. In Clay City the Bell company has pulled up its poles and surrendered the field to the Independents, maintaining only a toll station."

The principal topics assigned and discussed were: "County Service," "Equitable Rates" and "Limitation of Free Service." The discussion on the first topic was opened by Jesse W. Weik, of Green Castle. Mr. Weik said his experience convinced him that there should be no such thing as a free county service, but all rural line patrons should be given service on a toll line basis; all such lines should center in the county seat, thus making the chief town of each county the unit.

On the subject of "Equitable Rates" Mr. Klinger, of Brazil, said that telephone companies should provide a service that meets the requirements, and within the ability of the people in their respective territories to pay for. He insisted that some communities commanded a better service than others, and that the telephone business did not differ from other business in the matter of furnishing a service which the people were able and willing to pay for. In sparsely settled communities he recommended 1, 2 and 4 party lines at a less flat rate, and that all rates should be based upon the character and cost of the service given.

Mr. W. W. Harbaugh, of Sullivan, discussed the subject of "Limitation of Free Service." He said there is no more reason why a telephone company should give free service beyond a given territory on a flat rate than to expect the same from any other public utility company. He enumerated several reasons why all outside rural lines and connecting lines should be placed on a toll line basis. The plan could be made universal, he claimed, by the establishment of a toll line clearing house for each district, or better, a clearing house for the entire State.

These topics were more or less discussed by other members present, and resulted in a vote expressing a desire for the organization of a toll line clearing house for Indiana.

The district association passed a resolution requesting the officials of the State association to open headquarters in Chicago for the meeting of the International Association. J. G. H. Klinger, of Brazil, and W. W. Harbaugh, of Sullivan, were elected delegates to the international meeting.

The meeting closed with a banquet at the Terre Haute House, tendered by the Terre Haute Telephone Company.

THE NORTH STATE TELEPHONE COMPANY.
Murfreesboro, N. C., November 26th, 1907.

American Telephone Journal,
New York, N. Y.

Dear Sirs:—

Some weeks ago you asked me to state what I thought of the JOURNAL. *Judging by my delay you might reach the conclusion that I did not place a very high estimate upon its value. However, appearances are sometimes misleading, and this certainly is the case in this instance.*

My hands have been so full of urgent matter for attention that it has been impracticable to attempt an earlier reply.

I regard the JOURNAL *as ESSENTIAL TO THE SUCCESS OF INDEPENDENT TELEPHONE COMPANIES. It is also invaluable to the telephone man. SINCE MY SUBSCRIPTION BEGAN I HAVE NEVER FELT THE NEED NOR SEEN THE WISDOM IN SUBSCRIBING TO ANY OTHER PERIODICAL OF THIS NATURE. A BUSY MAN MUST NEGLECT READING PERIODICALS UNLESS THEY COME OFTENER THAN ONCE A MONTH, because they contain too much at the time to read and digest. Hence, the weekly edition is in itself a valuable method of conveying matters of interest. Then too, THERE IS NOTHING STALE ABOUT THE JOURNAL. It keeps abreast of the times. It keeps in touch with the conditions and developments generally of the telephone world, and is not localized in its scope. Long life and much success to the* JOURNAL!

Yours truly,
L. J. LAWRENCE, *President.*

ARRESTS BY TELEPHONE COMMON IN INDIANAPOLIS.

THE peace officers of Indianapolis are frequently employing the telephone in making

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WANTED—Position as general foreman for telephone manufacturer of instruments or inside wiring or line construction; can give best of references, also refer to the company I am now with. Address Box 979, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 979

WANTED—Good, all around telephone man, with practical experience in common battery switchboard and instrument work. Must be capable, sober and industrious. Preference given to man capable of handling labor to advantage. State references and lowest salary. Western Electric apparatus used almost exclusively. Address Box 985, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 985

WANTED—Position as superintendent of construction by an up-to-date man. Twenty years' experience in conduit, aerial, underground, cable maintenance; can handle men. Married, strictly temperate. References. Address Box 986, care AMERICAN TELEPHONE JOURNAL,, 100 William street, New York. 986

WANTED—High-grade maintenance and construction man, now in good position. Can make first-class proposition to right man. Give references, all former employers, present salary, and salary expected in first letter. Address Box 988, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 988

FIRST-CLASS wire chief desires plant up to three thousand lines. Ten years' experience with both Bell and Independent companies. Married, sober, industrious, good references. Address Box 989, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 989

MANAGER with ten years' experience desires position. Experience covers every detail, executive, construction and maintenance. Best of references. Married, sober and industrious, will guarantee results. Address Box 990, care AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 990

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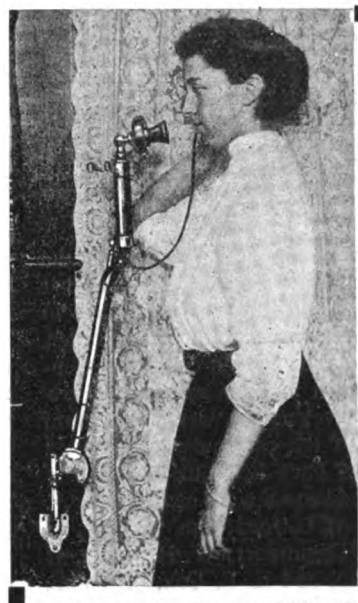
WANTED—One Warner Pole Changer. State general condition and price asked. Address Box 987, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 987



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Self-balancing in any position.
Attachable to any desk or woodwork.
Supplied with any Transmitter and Receiver.

MANAGERS, SEND FOR SAMPLE AND PRICES TODAY.

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1020 Walnut Street
Philadelphia, Pa.

Holtzer-Cabot Electric Co.
Boston, Mass.
Chicago, Ills.

Selling Magazine Says:

Whether the advertiser gets full value from a publication depends partly on the publication and partly on his skill in presenting his product; but the subscriber, as a rule, has only himself to blame if he fails to make a very large profit on a very small subscription investment. There are comparatively few technical journals that deserve consignment to the waste basket in their original wrappers.

Telephone Wire and Cables

BARE COPPER LINE WIRE

Weatherproof and Rubber Insulated Wire and Cables

Aerial—Underground—Submarine Lead Covered Cables

TERMINALS—STEEL STRAND—HANGERS

Standard Underground Cable Company

PITTSBURGH, PA.

Boston. New York. Philadelphia. Atlanta, Ga. Chicago. St. Louis. San Francisco, C Los Angeles, C

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arrests. The warrants are read to the accused over the telephone, and this reading is followed by a request that they appear in court the next morning. Only those charged with minor offenses are thus summoned to trial.

FRANCHISE ULTIMATUM GIVEN THE CUMBERLAND.

THE town council of Oakland City, Indiana, has given the Cumberland Telephone Company an ultimatum to either take out a franchise for the use of the streets and alleys or remove its property from the streets of the city.

The company has been doing business in Oakland City by sufferance; that is, operating without a franchise. Some time ago the company was cited to show cause why it should not take out a franchise or vacate the streets of the city, but notified the council that no action had been taken in the matter. Thereupon the city council ordered the city attorney to draw up a franchise and submit it to the company, and if it refuses to accept the terms of the new franchise in a short time it will be forced to quit the city entirely.

The Cumberland attempted to continue business in Petersburg under similar conditions, but when the city began removing the poles and wires the company accepted the proffered franchise.

INDEPENDENTS OF FIFTH OHIO DISTRICT SHOW SOLID ORGANIZATION.

INDEPENDENT telephone men of the Fifth District of the Ohio Association received a warm welcome when they met at Hamilton for the convention. All of the companies in the district were represented, men being present from Butler, Brown, Clermont, Hamilton, Preble and Warren counties. General reports of the telephone situation in their respective territories, and statistics showing the development, were brought in by delegates. It appears that all of the companies represented are in a prosperous condition, and have had during the past year a substantial growth. Short addresses were made by L. A. Miller, of Darrtown; S. M. Allen, of Oxford; Jno. McCray, of College Corner; D. C. Warner, of Higginsport; W. H. Baum, of Batavia; Frank Binkley, of Lebanon, and E. E. Cox, of Eaton.

The members also listened to very interesting talks by President Frank L. Beam, and Secretary Ralph Reamer, of the State association. James S. Brailey, Jr., president of the United States Long Distance Telephone Company, told the members that there is every reason to believe that the Independent companies of Ohio are now handling over 75 per cent. of the telephone business of the State. Interesting facts about improvements in methods of handling long distance business were given by C. Y. McVey, general manager of the United States Long Distance Company, while Mr. G. P. Thorpe, of Wilmington, spoke on various legal questions of interest to the members. Mr. W. Gilbert Thompson, general manager of the Hamilton Home Telephone Company, was re-elected vice-president of the district.

At the close of the meeting the members unanimously agreed that they had not only had a most satisfactory gathering from a business standpoint, but that the manner in which they had been entertained by Mr. Thompson and the Hamilton Home Telephone Company left nothing to be desired.

MAYOR OF OMAHA WARMLY COMMENDS INDEPENDENT TELEPHONE COMPANY.

WHEN the officials of the city of Omaha recently made a tour of inspection of the newly constructed plant of the Independent Telephone Company they became thoroughly convinced of the value to the city of the enterprise which has just commenced active operation. The party was taken to the branch exchange, and then to the main building, where they were shown the working of the automatic switchboard and auxiliary apparatus, including the power plant, and also through the well appointed offices on the lower floor of the main building. Favorable comments on all of the features were made by the officials.

After the visit one of the local newspaper men interviewed the mayor to get a statement concerning the city's attitude toward the release of the $25,000 cash deposit which had been put up by the company as an earnest of good faith, to insure the building of the plant. Mayor Dahlman said: "Here is about as good an evidence of good faith as anyone could ask. The actual expenditure of nearly $1,000,000 is a better guaranty than any $25,000 deposit. I am fully satisfied with the showing made and I believe that we are justified in releasing the deposit. It speaks volumes for the company that in an undertaking of this magnitude it has been able to go right along with its work, requiring such a constant outlay of cash, in the face of such a stringency as we have gone through for the last five or six weeks."

Recent Patents

SYSTEM OF DISTRIBUTION.

J. B. Taylor, Schenectady, New York, patent 873,107, Dec. 10, 1907, assigned to General Electric Co.

The system of distribution described in this patent has to do with alternating currents of high potential so arranged as to eliminate static and magnetic interference in adjacent telephone and telegraph lines.

This condition, the inventor states, he can accomplish by so connecting the transformers at the sub-stations that adjacent sections are maintained at relatively opposite potentials with respect to earth, thus having the static inductions of the two sections on an adjacent conductor neutralize each other.

PARTY-LINE LOCK-OUT SWITCH.

O. F. Forsberg, Chicago, patent 873,362, Dec. 10, 1907, assigned to W. E. Co., Chicago.

This patent describes improvements in a switching device wherein an electromagnetically operated stepping lever is arranged when rocked in one direction to advance a ratchet, which, as it leaves normal position, opens the talking circuit of the station where the relay is located. When the ratchet has been advanced a number of steps corresponding to the number of the station where it is located, mechanism is brought into play to cause the stepping arm when given a movement in the opposite direction to close contact springs to complete the talking circuit of the station. The ratchet may then be advanced to the end of its movement, when it will bring into service mechanism which, when the lever is caused to again rock in the opposite direction, at the termination of the conversation, will cause the lever to release the ratchet, which then returns to normal position, opening the contact springs, and restoring the normally existing talking circuit.

PARTY-LINE TELEPHONE SYSTEM.

N. S. Page, New York, patent 873,588, Dec. 10, 1907.

The system described in this patent is of the selector lock-out type and employs a relay so arranged in the instrument circuit as to perform a double office when energized, first to allow of any telephone on the line to be connected up ready for ringing and talking, provided no other instrument on the line is in use, and second to complete the ringer circuit so that it may be operated to a receptive condition for signaling on incoming calls.

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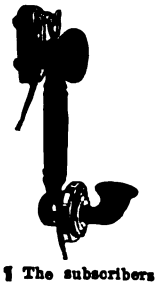

EASY TO SEE
THAT IT IS
EASY TO PHONE
WITH THE
EASOPHONE
IT IS HOW YOU HEAR

¶ The subscribers are pleased.
with it because it is so easy.
¶ They never report "phone out of order."
¶ They find the Easophone so convenient,
attractive and efficient that it is easy
to persuade them to put in extensions.
¶ They tell their friends about the Easophone.
¶ See, now, why it is a contract agent?

INSTALL 6 STATIONS—WATCH RESULTS.

W-ITE NOW
FOR SPECIAL OFFER.

¶ Let us explain in detail how the
Easophone gets subscribers for you.
¶ Easophone, the steel construction
profit builder.
¶ **Remember, it is how you hear.**

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The Wire & Telephone Co. of America, Rome, N. Y.
Manufacturers telephones, telephone supplies, bare copper, office, magnet, annunciator and telephone wire.

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For Protecting Crossings

Where your telephone wires cross other wires, gas pipes, water pipes, iron beams and brick or stone work Circular Loom affords a strong, economical means of insulation and protection.

AMERICAN CIRCULAR LOOM CO. TRADE MARK REGISTERED

IN TELEPHONE SYSTEMS ITS USES ARE LEGION—EVERY ONE OF WHICH MEANS MONEY SAVED

Order from your dealer or address

AMERICAN CIRCULAR LOOM CO.
CHELSEA, MASS.

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THE CALCULAGRAPH
RECORDS REFRESH MEMORY

Often a subscriber has forgotten the exact circumstances and duration of time attending a toll connection by the time he receives a bill. Such arguments as subscribers are prone to offer in cases of this kind are readily offset by showing a Calculagraph Record, which is indisputable evidence as to the correctness of the charge.

IT MAKES NO CLERICAL ERRORS

Get Our Reason Why Booklets.

CALCULAGRAPH COMPANY
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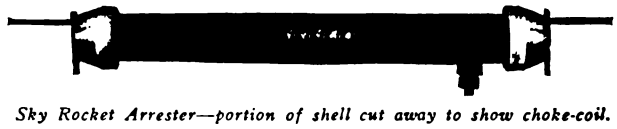
Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.

SKY ROCKET LIGHTNING ARRESTERS

Constructed and sold for the purpose of reducing to a negligible quantity the troubles and discomforts experienced by



Sky Rocket Arrester—portion of shell cut away to show choke-coil.

telephone men during electrical storms.

They are simple in construction, efficient in operation and always reliable.

Sample and prices on request.

Write Us on Your Letterhead

CHANCE MANUFACTURING COMPANY
CENTRALIA, MO.

See Our Exhibit at the Electrical Show, Chicago, January 18-25, 1908.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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Practical Questions and Answers

COMBINED TELEPHONE AND SWITCHBOARD.—(954.)

We have in several places near our central exchange a small number of lines running into a central point, whose calls are, to a large degree, for each other, calls to the central office being infrequent. Under these conditions, we could just as well as not have calls for subscribers at the exchange switched in over this central point, thus saving much line construction material. We do not deem it advisable, however, to install a small switchboard, as there are but three or four lines running into each of the central points; therefore, we will be pleased to have you show us some simple circuit arrangement for connecting these lines into the one telephone we now have at the central point, so that it would act as a combination telephone and switchboard. D. F. M., Illinois.

SUCH a combination as you desire may be secured with little cost, and can be very simply connected to the instruments you now have at the central points. All the material you will need at each central point will be about four pairs of plugs and cords, four two point individual jacks, as many three point line jacks as you have lines running into the central point, and one additional plug for operator's set. All of these jacks can be mounted in the telephone cabinet, with the plugs mounted on the instrument shelf. The circuit arrangement is shown in Fig. 954.

LIMIT FOR FREE SERVICE ON RURAL LINES.—(955.)

We have rural lines radiating from our central to a distance of 20 miles or more. Town subscribers as well as rural subscribers have at present the free use of all our lines; others pay toll while using our rural lines. We are about to still further extend our lines. Now, regarding distance, etc., a line has to be drawn somewhere as to what free service may properly be granted the different subscribers. We should like very much to hear from telephone men who have worked out of this difficulty in a satisfactory way. UNINITIATED, Canada.

AMONG the answers to this inquiry, which was published some time ago, one of the most interesting is that from G. H. Glass, general manager of the Citizens' Telephone Company, Pekin, Ill. He says: "There has been a rather long delay in accepting the invitation to reply to this inquiry, but I may say, in respect to this, that it has been for the reason that the Citizens' Telephone Company has been working overtime in its endeavor to supply the demand made upon it for telephones. The trouble with this free service proposition is that there are almost as many conditions to be met as there are telephones on rural lines. We believe our plan is one which will work out satisfactorily when conditions are similar to those we have met. In the first place, we do not build rural

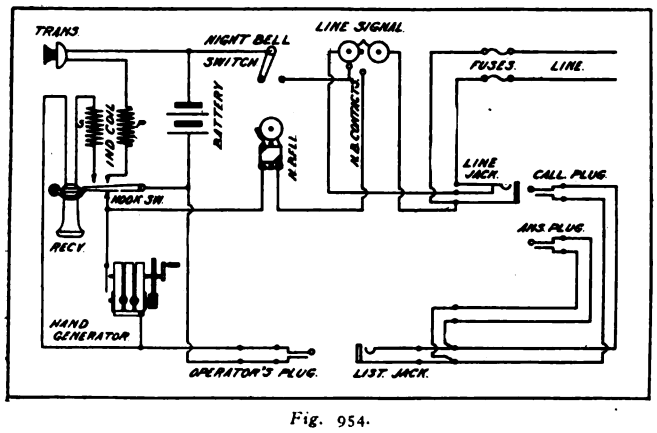

Fig. 954.

lines unless we can secure at least three subscribers at our regular city rates per mile, and consequently we can extend our lines to twenty or thirty miles and still get a fair return on our investment. You see we do make the rural subscribers pay the fiddler. Also we make every one who makes general use of the telephone pay his part. If a non-subscriber wishes to use the rural lines he is required to pay a line charge of ten cents. Also if a rural subscriber wishes to call Mr. John Doe, who is not a subscriber, in city or country, he is required to pay a line charge of ten cents and any messenger fee that may accrue. You see, if Uninitiated could do as we do and secure enough patrons on the rural line at regular monthly charges, he might put entirely out of his mind the question as to how far free service could be extended. As a matter of fact, no telephone company should attempt to give free service to its regular subscribers, free service between cities and towns or anywhere else. After twenty-six years of experience in the business we find that we have nothing to give away to outsiders,

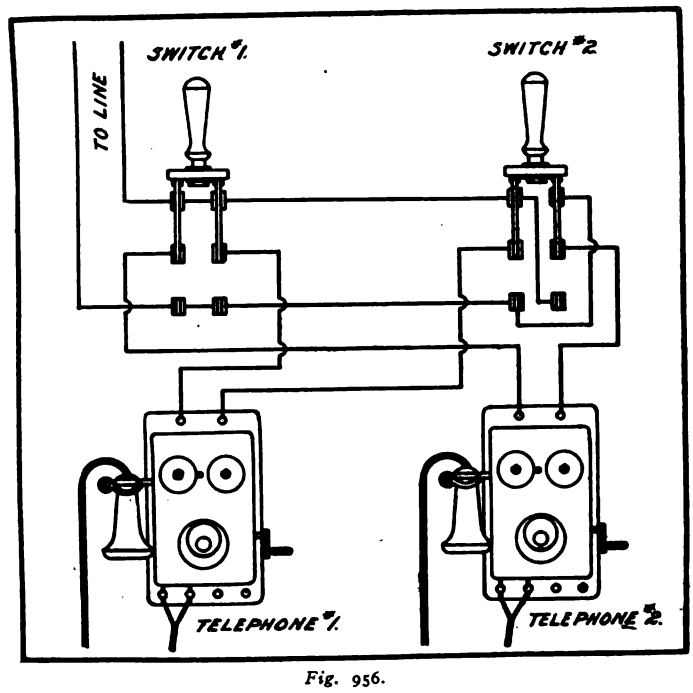

Fig. 956.

and that as a rule we Independents are giving too much service for the money we are getting. I should infer from the query that Mr. Uninitiated's rural lines are on the switching charge basis. In that case it might be found advisable to restrict the free use of the lines to the patrons on these particular lines and make a line charge to all city and town subscribers. In such a case the limit would be fixed by the number of subscribers that can be put on a line and receive good service, and pay a profit, this depending very largely upon local conditions. In connection with the question of the appropriateness of charges to the rural subscriber for switching privileges, we have found it advisable to proceed on the basis such subscribers are paying their regular city rates for the privilege of obtaining service with other subscribers in the city to whom the telephone company may connect them, and they are not paying for connection with rural subscribers, who are paying a switching charge for switching among themselves and to the city subscribers."

AN UNUSUAL PROBLEM.—(956.)

We have one subscriber on our exchange who desires two telephones connected on the same line, but so arranged with a switch at each telephone that when he is at one telephone he may cut out the other regardless of the position of the switches. That is, if he were at No. 1 telephone in one part of the building, he could, by manipulating his switch, cut out No. 2 telephone, regardless of the position of the switch at the second instrument. How can this be done? A. M. S., Michigan.

IN Fig. 956 we have indicated a circuit arrangement which will accomplish the purpose you desire. You will note that at each instrument there is a double pole, double throw switch, which, when connected in the manner shown with the instruments and the line, conditions, are as follows: With both switches up, or down, telephone No. 2 is connected to the line for conversation, but No. 1 instrument is short circuited. With switch No. 1 up and No. 2 down instrument No. 1 is connected, but No. 2 is out. With switch No. 1 down and No. 2 up the same conditions obtain.

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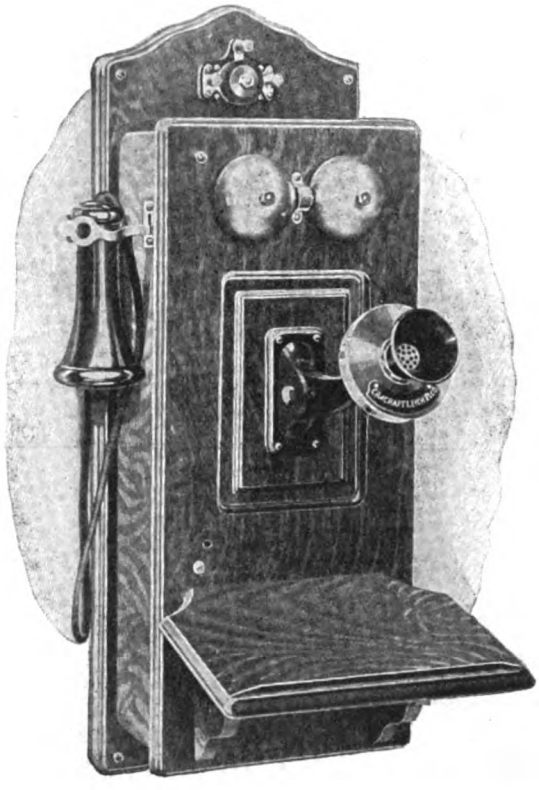
CRACRAFT, LEICH TELEPHONES

Series

Bridging

Sure Ring

Central Checking



Non-Interfering

Divided Circuit

Selective Signaling

Silent Ringing

Our Compact Type Telephones meet all requirements—Standard or Special

WRITE US

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From Shops and Factories

IN THE FIELD.

I have seen, since I've been taking
  Busy jaunts to witness things,
Many switches softly shaking
  From the contact to the hinge.
I have seen these junks of metal
  Heave and quiver, turn to blue,
Like 'twas earthquake or a battle,
  'Stead of current passing through.

I have seen a man like crimson,
  As he ran about and cried—
"Give me Trumbull—Trumbull—quick, son—
  Damn the others that I tried,
When I wouldn't list to reason,
  More than one wee mouse,
Now you come, my man, in season
  And your goods shall stock my house."

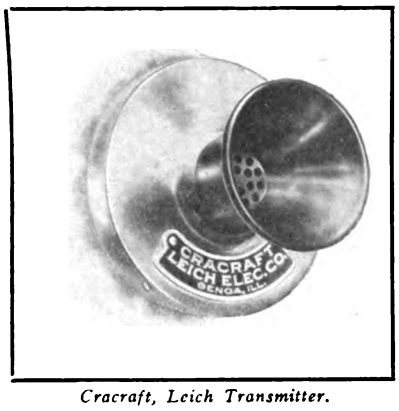
I have walked with steps elated
  From such men, who by some bluff,
Have been turned to goods belated,
  To "Just as good, but cheaper" stuff;
And I thank the friends who show us
  That the Trumbull Switch is true—
And I want you each to know us,
  John and Fred and Will and you.

—Trumbull Cheer.

THE CRACRAFT, LEICH TRANSMITTER.

DURING the past decade the patent office has been swamped with transmitter patent applications. During the last five years the majority of the better patent applications have been restricted to carbon chamber with auxiliary diaphragms, some having the carbon chamber moving with the main diaphragm, others having the carbon chamber stationary. Some transmitters are provided with two diaphragms, one on each end of the chamber, and diaphragms of metal and mica come in for attention. But the fact still remains that without any material difference in the type of instrument, the most essential features in the production of a transmitter of the highest quality are the dimensions and the proportions of the auxiliary and main diaphragms, the correct resistance and size of the carbon granules, all of which cannot be embodied in a patent application.

Patentable features, as the new method of applying dampening springs to the main diaphragm and other appliances embodied in the transmitter shown in the accompanying illustrations, are nevertheless valuable and desirable, and aid in the convenience of manufacturing such parts as are essential to obtain the necessary acoustical, electrical and mechanical results.



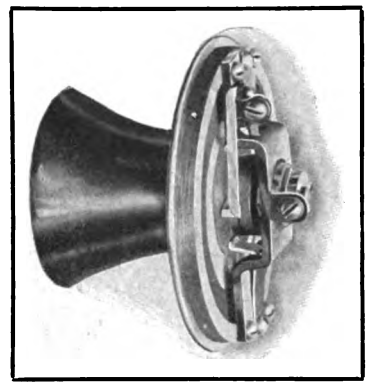
Cracraft, Leich Transmitter.

The appearance of the transmitter front and back, the connector and the terminals are all of minor importance in connection with the efficiency of transmitting speech, but too much stress cannot be laid on the design and manufacture of these auxiliary parts, in order to produce a transmitter that is clean and neat in design, readily gotten at, and above all permanent.

The granular carbon as commonly used in transmitters has for many years caused the majority of manufacturing companies a great amount of anxiety, and as a rule all blame is laid on the innocent carbon by people that have not made a thorough study of the transmitter, although they should feel assured that in most cases it was anything but the carbon granules that gave the trouble. There is no question but that the granular carbon must be of high quality, but this is only one important feature.

The Cracraft, Leich Electric Company is watching not only the general features above outlined, but states that it is paying the most careful attention to every detail of manufacture. It believes that the careful selection of materials and the accuracy of manufacture which will insure uniformity of working is producing a transmitter which will be recognized as thoroughly efficient.

AMERICAN CONDUIT COMPANY, 140 Nassau street, New York, is just sending to its customers an interesting illustrated card showing a large case of its fiber conduit being loaded aboard ship to be forwarded to South America. The special point about this photograph is that the crate with its contents, which show no injury whatever, is one which has been handled seven times since leaving the company's factory and the company believes that this is an interesting demonstration of the adaptability of its product for shipment under all conditions likely to be met. The company will be pleased to furnish information to interested parties.



Cracraft, Leich Transmitter, Shell Removed.

TELEPHONES AS CHRISTMAS PRESENTS for houses and short line systems at a low cost are among the features being advertised by the Commercial Electrical Supply Company, St. Louis, Mo. The firm believes that a man understanding the uses of telephones can place a great many of these in residences where people may wish to supplement the advantages of regular exchange service by private lines.

THE CENTRAL TELEPHONE & ELECTRIC COMPANY, 2131 Lucas Avenue, St. Louis, Mo., has a large stock of Bois D'Arc pins on hand and is quoting new prices. The Central company claims that these pins are equal to if not better than oak, locust, birch or maple and that they are close grained, long lived and strong. The company also is sending free a pack of shield emblem playing cards to customers.

SECURITY POLE SEATS are made of angle iron, bent at the corners, so that all of the metal is preserved. This work is done with special machinery, with the object of providing a continuous rim, which looks well and has great strength. The seats are tested to one thousand pounds, but the manufacturers say they will carry a ton. The cross slats are heavy and machine rivetted to the under side of the rim, leaving a smooth exterior. The front slat is punched to receive pliers or a screwdriver which a lineman may wish to put aside for a moment while working. The pole braces are of angle iron, and are very light and strong. These seats are sold at low prices. Full information may be obtained by writing to The F. Bissell Company, Toledo, Ohio.

THE KNOX-DICKEY TELEPHONE MFG. COMPANY, of Portsmouth, O., has recently purchased the equipment of the Williams Telephone & Supply Company, of Cleveland, O. The Williams Telephone & Supply Company's plant will shortly be removed to Portsmouth, and installed and ready for operation soon after the first of January. Mr. Dickey, of the Knox-Dickey Company, reports that a number of men of strong financial standing in his community have become interested in his company, and that it is their expectation to increase the capitalization, and prepare for more active operations in the field of supplying Independent telephone companies with telephones, switchboards and other supplies.

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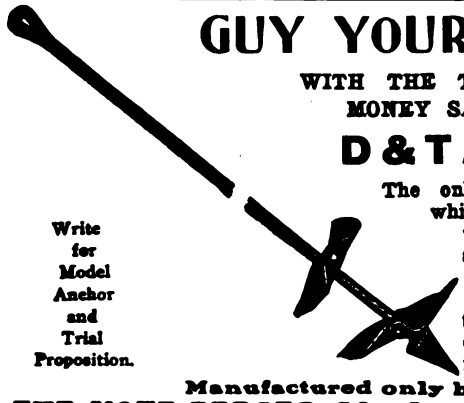
GUY YOUR POLES

WITH THE TIME AND MONEY SAVING

D & T ANCHOR



The only patent anchor which is installed without the aid of special tools.

Just drive and twist. Installed by one man in one minute.

Write for Model Anchor and Trial Proposition.

Manufactured only by

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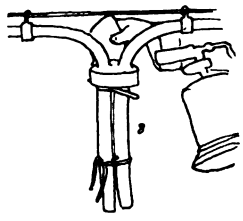
See our exhibit at the Electrical Show, Chicago, January 13-25, 1908.

HOW TO MAKE A JOINT

THAT CAN BE OPENED FOR TESTING



The construction of the joint, the material used, its advantages for testing and other telephone construction subjects are explained in a booklet containing 28 illustrations SENT FREE TO ANY ADDRESS.

W. N. MATTHEWS & BRO.

216 N. 2nd Street, St. Louis.

See our exhibit at the Electrical Show, Chicago, January 13-25, 1908.

IRONITE

Duplex Drop Wire

Never breaks inside the insulation. Every trouble man knows how hard it is to locate such a break and stop the trouble.

IRONITE will not sag or stretch. It is as flexible as hard drawn copper and will not break when twisted or "kinked."

The insulation of **IRONITE** is absolutely unequalled. **There is no satisfactory substitute,** and most important of all, **IRONITE costs 25% less than copper, even at the present low price of copper.**

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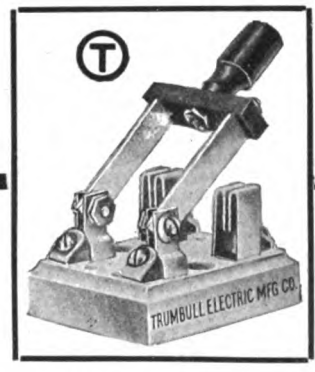

Self-adjusting clips held firmly in the recesses in the base insure a proper alignment and prevent loose, resistance introducing contacts. Selected high grade porcelain only used for bases. Each switch undergoes thorough test and inspection before leaving our factory.

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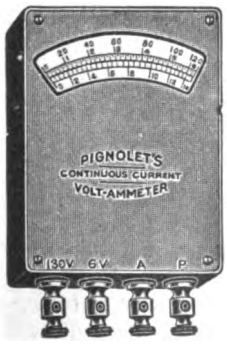

WHEN LOOKING FOR TROUBLE

Use Our Special

TELEPHONE VOLT-AMMETER

It Measures

VOLTS—AMPERES—RESISTANCES

FITS THE POCKET

Louis M. Pignolet

78 CORTLANDT ST. **NEW YORK, N. Y.**

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News Notes of the Week

NEW COMPANIES.

ELDORA, IA.—Articles of incorporation have been filed by the Providence Township Mutual Telephone Company. It has an authorized capital stock of $10,000, and G. W. Mitchell and others are among those interested.

GARVIN, MINN.—An Independent telephone company, to be known as the Co-operative Telephone Company, has been organized at this city, and expects to install an up-to-date system.

KENSINGTON, MINN.—Articles of incorporation have been filed by the Kensington Telephone Company. It has a capital stock of $10,000, and the incorporators are A. H. Christensen, A. H. Kullander, C. O. Lund, Theodore Johnson, J. E. Anderson, L. A. Larson, Erick Johnson, J. A. Wedum and Peter Bandin.

PALMYRA, MO.—The Palmyra Telephone Company, of Palmyra, has been incorporated with a capital stock of $6,000. Among the incorporators are Louis Frazer, J. A. Miller, George W. Pine and others.

RICHLAND, MO.—An Independent telephone company has been organized at this place by a number of the leading business men and farmers, and has taken over the exchange formerly owned by E. E. Noe. The company is to be known as the Richland Telephone Company, and start with a capital of $25,000, of which $6,500 has been paid up. The following officers have been elected: Ed. Linksweider, president; C. L. Evington, vice-president: E. E. Noe, secretary, treasurer and manager. The directorate is composed of J. W. Armstrong, M. J. Groom, A. A. Parsons and J. R. Brownfield.

KING, N. C.—The Farmers' Quickstep Telephone Company, of King, Stokes county, which has an authorized capital stock of $25,000, has been incorporated.

ARVILLA, N. D.—The Hegton Telephone Company, of Arvilla, which expects to install, maintain and operate a telephone plant at that city, has been incorporated by W. G. Williams, M. McCabe, Owen Williams, all of Arvilla, and others.

MONTPELIER, N. D.—An Independent telephone company, which is to be known as the Montpelier Telephone Company, has been incorporated, and expects to at once commence the construction of a rural system extending east and west from Montpelier.

SAWYER, N. D.—The Western Telephone Company, which has a capital stock of $50,000, has been incorporated. Among those interested in its formation are William Hodges and O. J. Mortenson, of Sawyer, and N. T. Weum, of Minneapolis, Minn.

BUTLER, PA.—An Independent telephone company is being organized at this city by A. O. Miller, Thomas H. Greer, W. T. McDonald and Harry Hamilton, and application for a charter is to be made. It is to be called the Butler County Telephone Company, and proposes to do business in the counties of Butler, Armstrong, Clarion, Mercer, Lawrence, Beaver, Crawford, Vanango and Erie, with its principal offices at Eau Claire, Butler Co.

GROVER, S. D.—The farmers residing in the vicinity of Grover have organized a telephone company, and expect to construct Independent rural lines in and about that city. Articles of incorporation have been filed at Pierre, and charter has been received. Among the incorporators are Asa Lebert, Paul B. F. Born, Lewis Hallauer, August Klatt, Joseph McFerren and John M. Kuhlman.

CLOVER, VA.—The Piedmont Telephone Company, of which W. H. Dorin is president; R. H. Fuller, vice president and general manager, and G. B. Gibson, secretary and treasurer, has been organized, and a line erected between Clover and Mount Laurel. It is the intention of the new company to construct lines into the surrounding country.

HAWKINS, WIS.—Among the newly organized Independent telephone companies is the Hawkins Telephone Company, of Hawkins, Rusk county. The capital stock is placed at $800, and the incorporators are Antone Paulson, E. R. Cram and W. H. Pierce.

COLDSTREAM, ONT., CAN.—Articles of incorporation have been filed by the Lobo Telephone Company, Ltd., of Coldstream, Lobo Township. The capital stock is given as $10,000.

FRANCHISES.

GLASGOW, KY.—A newly created franchise at this place, for which application was made some little time ago by the Home Telephone Company, has been acquired by Travis Taylor, its representative, the purchase price being $50. Work on the construction of its system will be commenced at an early date.

NEW ORLEANS, LA.—Application for permission to install and operate a telephone system in this city has been made by Charles B. Stark, who is said represent a number of Boston capitalists.

NEW ORLEANS, LA.—The Tulane Telephone and Telegraph Company has applied to the City Council of New Orleans for a franchise to install, maintain and operate a telephone plant in this city.

PETERSBURG, VA.—Additional construction privileges have been granted to the Petersburg Telephone Company at this city.

MONTPELIER, VT.—The Union Telephone Company, whose principal lines are located in Cabot and Marshfield, and which has secured a franchise at Barre, is considering the advisability of applying for permission to operate in Montpelier.

ELECTIONS.

RIGGSTON, ILL.—The officers of the Riggston-Merritt Telephone Company, which is a reorganization of the Merritt Northwestern Telephone Company, are T. M. Hardwick, president; Edward Morriss, vice president; W. D. Hitt, secretary and treasurer.

FORT WAYNE, IND.—At a recent meeting of the Nine Mile Telephone Company, Nine Mile, Ind., P. O. address, Fort Wayne, the following officers were elected: President, Frank Harber; vice-president, George Coverdale; secretary, William Dalman; treasurer, A. H. Lopshire; general manager, R. H. Minich.

BOONE, IA.—At its annual meeting the Farmers' Co-operative Telephone Association elected the following officers: President, V. O. Holcomb; secretary, S. G. Wheeler; treasurer, Antone Nelson.

GRINNELL, IA.—The Interior Telephone Company, at its annual meeting held at this city, recently elected the following officers and directors: President, H. L. Beyer; vice-president, M. Rew; secretary, W. S. Hendrixson; treasurer, C. W. H. Beyer. Directors: C. W. H. Beyer, Harold L. Beyer, C. R. Clark, W. S. Hendrixson, J. P. Lyman, M. Rew and J. F. Wilson.

NORTHWOOD, IA.—The following directors have been elected by the Northwood Telephone Company: O. V. Eckert, C. H. Beckett, L. O. Brown, Otto Buth, N. T. Christianson, Dr. Dwelle, J. H. Huber, M. D. Johnson, R. P. Johnson, Hans Madson, A. O. Peterson, T. L. Ringham, O. A. Tenold, G. E. Whitcomb and W. A. Willing.

SPRINGDALE, IA.—The following officers and trustees have been elected by the Rochester & Springdale Telephone Company: Charles E. Mather, president; F. G. Reeve, vice president; J. W. Eves, secretary; Edward Negus, treasurer. Trustees, W. B. Ellyson, A. D. Linn, George Phelps.

LIBERTY, N. C.—The newly organized Liberty Telephone Company has elected the following officers: President, J. F. Pickett; secretary and treasurer, J. A. Hornaday. The directors are C. P. Smith, Jr., A. E. Lewis, A. W. Curtis, G. A. Foster and W. M Hanner

PORTALES, N. M.—The following officers and directors have been elected by the Roosevelt County Telephone Company: President, C. E. Lukens; vice president, S. L. Ogle; secretary, W. E. Lindsey; manager and treasurer, C. E. Harris; directors, R. C. Reid, E. T. Massey, W. F. Boyless.

FINLEYVILLE, PENN.—The Bethel Telephone Company has elected the following officers and directors: President, W. T. Phillips; vice president, W. J. Anderson; secretary, James P. Wilson; treasurer, F. C. Weydermeyer; directors, A. H. Anderson, S. F. Boyer and Edward J. Edwards

SUNNYSIDE, WASH.—The stockholders of the Yakima Valley Telephone Company have named the following officers and trustees: S. J. Harrison, president; W. P. Sawyer, vice-president; R. C. Lichty, secretary and treasurer. Trustees: W. P. Sawyer, G. H. Irish, A. C. Webber. S. J. Harrison.

BARABOO, WIS.—The Farmers' Mutual Telephone Company, which operates in the towns of Baraboo, Fairfield, Greenfield, Excelsior and Freedom, has elected the following officers: President, Simon Cobleigh; vice-president, George Harrison; secretary, W. S. Halsted; treasurer, Orrin Getchell.

FINANCIAL.

SKIDMORE, MO.—The Nodaway Valley Telephone Company, of Skidmore, has increased its capital stock from $3,000 to $5,000.

JEFFERSON, O.—At a recent meeting of the stockholders of the Jefferson & Warren Telephone Company, it was decided to increase the capital stock from $80,000 to $100,000.

MISCELLANEOUS.

WARDNER, IDA.—The North Fork Telephone Company has received a franchise to erect poles and string wires at Wardner, Ida., east of Spokane. The head office at Wardner will be under the management of Walter Clark, chief electrician of the Bunker Hill & Sullivan mine. The route of the line will be along the North Fork and the Idaho Northern right of way.

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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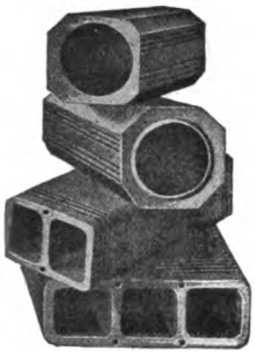

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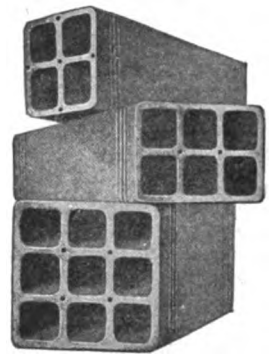

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News Notes of the Week

REASNOR, IA.—The Reasnor Mutual Telephone Company, which operates lines in and about this city, is considering the advisability of forming connections with the Jasper County Telephone Company of Newton.

BARBOURVILLE, KY.—At a recent meeting of Louisville and Barbourville capitalists it was decided to construct a long distance telephone line from Middlesboro to Louisville, a distance of about two hundred miles. It is understood that the Independent telephone companies are behind this project, and work is to be commenced at once.

BRECKENRIDGE, MINN.—The capital stock of the newly organized Independent telephone at this city, which is to be known as the Breckenridge Telephone Company, is $50,000, and the incorporators are H. L. Shirley, J. H. Ehlert, Joseph Quinn, G. W. Burrows and Ralph Davis.

BRECKENRIDGE, MINN.—Arrangements are being discussed by the Tri State Telephone Company for the handling of the long distance business of the newly organized Breckenridge Telephone Company at this city.

JACKSON, MISS.—N. D. Smith, of Jackson, Tenn., expects shortly to organize an Independent telephone company at Jackson, Miss.

MONTPELIER, N. D.—The capital stock of the newly organized Montpelier Telephone Company is $5,000, and the incorporators are Frank S. Eddy, R. C. Carley, M. H. Johnson and others, of Montpelier.

BANGOR, PA.—At a recent meeting of the Plainfield Township Rural Telephone Company and the Washington Township Rural Telephone Company, held at this city, it was decided to effect a combination of the two organizations.

McLEOD, ALB., CAN.—W. H. Cushing, minister of public works, has purchased the telephone plant at McLeod. This is an important acquisition, as it is considered to be the key to the telephone system being built by the government in the southern portion of the province.

REVELSTOKE, B. C., CAN.—Owing to difficulties with the British Columbia Telephone Company, the city council has held several discussions on the advisability of owning its own telephone system. Address Alderman Abrahamson, Revelstoke, B. C.

VICTORIA, B. C., CAN.—The government has taken over the control of the Victoria and Cape Beale telegraph and telephone line. This line was formerly operated for the government by the Canadian Pacific R. R. Co., but only a day service was given. In the future the service will extend over the twenty-four hours.

PERSONAL.

A. T. BAKER has been promoted to the management of the Michigan State Telephone Company's office at Sault Ste. Marie, Mich.

J. E. HANNON has been appointed manager of the exchange of the Northwestern Telephone Exchange Company at Fargo, N. D.

J. F. MARTIN has been advanced from the management of the exchange of the Michigan State Telephone Company at Sault Ste. Marie to that of the office at Iron River, Mich.

CLAY McCLURG has been promoted from the management of the Mansfield exchange of the General Union Telephone Company to that of the larger office at Akron, O.

G. E. McFARLAND, who has been superintendent of the Iowa Telephone Company, has been elected vice-president and general manager and also president of the Western Electric Telephone Company, to succeed E. B. Smith, who has recently resigned.

J. H. PITTS has been appointed manager of the exchanges of the Cumberland Telephone & Telegraph Company at Waverly and McEwen, Tenn.

E. B. SMITH, who has been vice-president and general manager of the Iowa Telephone Company and president of the Western Electric Telephone Company, resigned these positions at a recent meeting of the board of directors.

E. P. WISE, formerly of Los Angeles, Cal., has been appointed manager of the San Bernardino exchange of the Pacific Telephone & Telegraph Company.

New Construction

MOBILE, ALA.—The Louisville & Nashville Railroad Company, whose railway telephone system now extends to Georgiana and Flomaton, expects to make further additions to its plant.

ASHDOWN, ARK.—The lines of the Nashville Telephone Company have been extended to this city, and other improvements are being considered.

MODESTO, CAL.—A rural telephone line out of this city is being constructed by Messrs. Ross and Griswold.

SHARON, CONN.—The Sharon Telephone Company has just completed a line from their Millerton Exchange to North East Center and vicinity, and contemplates the further enlargement of its plant.

LAURELHILL, FLA.—Many improvements in its system have been made by the Laurelhill Telephone Company, and other extensions are being considered.

PESOTUM, ILL.—It is the intention of the Pesotum Telephone Company to entirely rebuild its system, and make its plant up-to-date in every particular.

SPEARVILLE, KANS.—A telephone line which is to extend north of Spearville, and connect with the Watson line from Kingsley, is being built by J. Klinefelter and others of this city.

WEST GRAY, ME.—Among the new lines recently erected by the Pine Tree Telephone Company is one at West Gray, and the company is planning to further extend its system along the Dutton Hill road.

DOWAGIAC, MICH.—The Cass County Home Telephone Company, which has established an exchange at Volinia, has completed its exchange in this city. It is its purpose to add to its present system, and to give a strictly first class service at Dowagiac.

LA GRANGE, MO.—Lines between La Grange and Quincy are being erected by the Mississippi Valley Telephone Company.

WESTPLAINS, MO.—The Farmers' Mutual Telephone Company is building a line from Westplains to Brandsville, and expects eventually to continue it to Olden, where long distance connections are to be established with St. Louis.

ANACONDA, MONT.—Work on its system at this place is being carried on at a rapid rate by the Independent Telephone Company.

WEST RUMNEY, N. H.—Among the extensions planned by the White Mountain Telephone Company is a line from West Rumney to Dorchester.

PORTALES, NEW MEXICO.—The Roosevelt County Telephone Company, which has recently expended about $13,000 in extending its system, contemplates making many other improvements in its plant.

HUDSON, N. Y.—The Columbia Telephone Company, of this city, has completed a five mile extension near Ghent, N. Y., connecting with their Philmont exchange.

PATTERSONVILLE, N. Y.—To take care of its greatly increased business, the lines of the Pattersonville Telephone Company are to be materially extended.

HIGH POINT, N. C.—Besides the extensive improvements which it is making at this city, the North State Telephone Company expects to extend its lines to a number of other cities and towns.

COLLINS, O.—The plant of the Townsend Telephone Company is being enlarged to take care of its increased business.

SILVER LAKE, OREGON.—At a recent meeting of the stockholders of the Farmers' Mutual Telephone Company it was decided to enlarge its plant to take care of new business.

FINLEYVILLE, PA.—Considerable development work is planned for the near future by the Bethel Telephone Company, which operates in the territory surrounding Finleyville.

NAZARETH, PA.—Additional lines between Nazareth and Easton are being installed by the Slate Belt Telephone Company.

SUSQUEHANNA, PA.—A private telephone system is to be installed by the Erie Railroad Company in its shops, offices and railroad yards. It is to have its own central offices, and it is estimated that about forty-four telephones will be put in.

FT. PIERRE, S. D.—Work on its system from Ft. Pierre to Black Hills is being carried on by the Homestead Telephone Company.

LUBBOCK, TEXAS.—A line between Lubbock and Emma, which has just been completed by the Staked Plains Telephone Company, gives it about two hundred miles of long distance lines, and it expects very shortly to make other extensions.

PITTSFORD, VT.—The lines of the Champlain Valley Telephone Company are being extended in this city.

BERRYVILLE, VA.—A new switchboard has been installed at this city by the Frederick & Clarke Telephone Company, and other improvements are under advisement.

DEWITT, VA.—The Dinwiddie Telephone Company has just completed the installation of an up-to-date exchange at this city, and is now considering the extension of its lines into the western part of Dinwiddie county.

SUNNYSIDE, WASH.—At a recent meeting of the stockholders of the Yakima Valley Telephone Company it was decided to install a new switchboard in the Sunnyside Exchange, and to build lines to a number of the smaller towns of the valley.

ARKANSAW, WIS.—A line between Arkansaw and Plum City is being erected by the Farmers' Telephone Company.

NORTH CAPE, WIS.—The Franksville Telephone Company is building lines north and east of North Cape.

MILWAUKEE, WIS.—The Milwaukee Independent Telephone Company expects, in conjunction with the Valley Telephone Company, of Appleton, to erect a toll line between the two cities, giving connections to Neenah, Menasha, Green Bay, Madison and numerous intermediate points.

MELITA, MAN., CAN.—The Melita-Arthur Telephone Company, of Melita, has put in operation a line to the Broomhill District, and contemplates other extensions at an early date.

TORREON, MEXICO.—The telephone system at Torreon, which is the property of Juan Woessner, has been extended from that city to Matamoras, Coahuila, at which place a modern exchange has been installed. He has also erected lines to Gomez Palacio, Durango, Lerdo and other places.

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Vol. 16 NEW YORK—DECEMBER 28, 1907—CHICAGO Number 26

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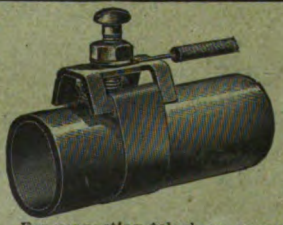

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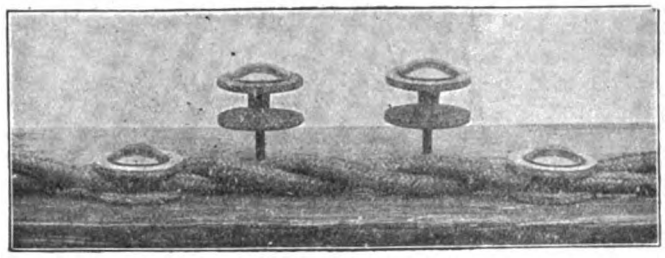

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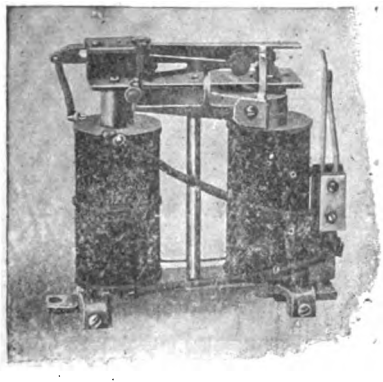

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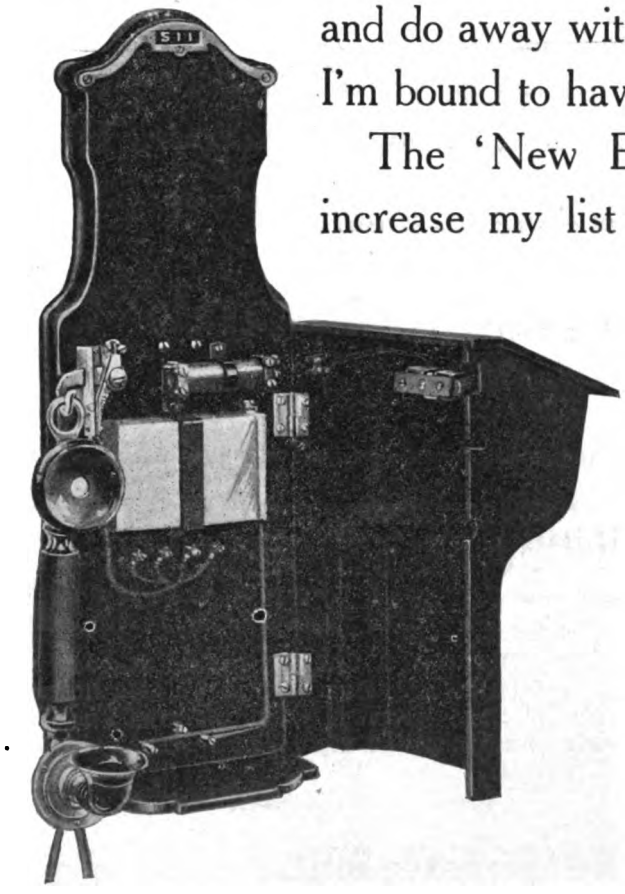

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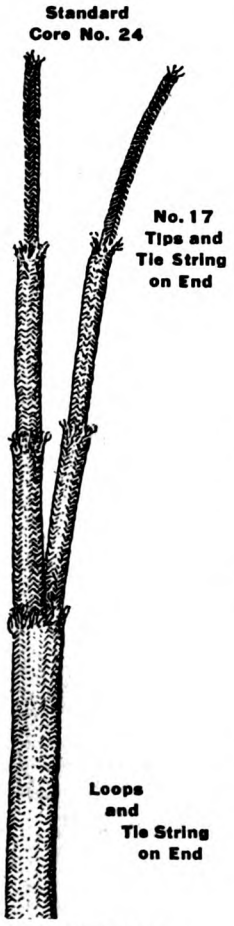

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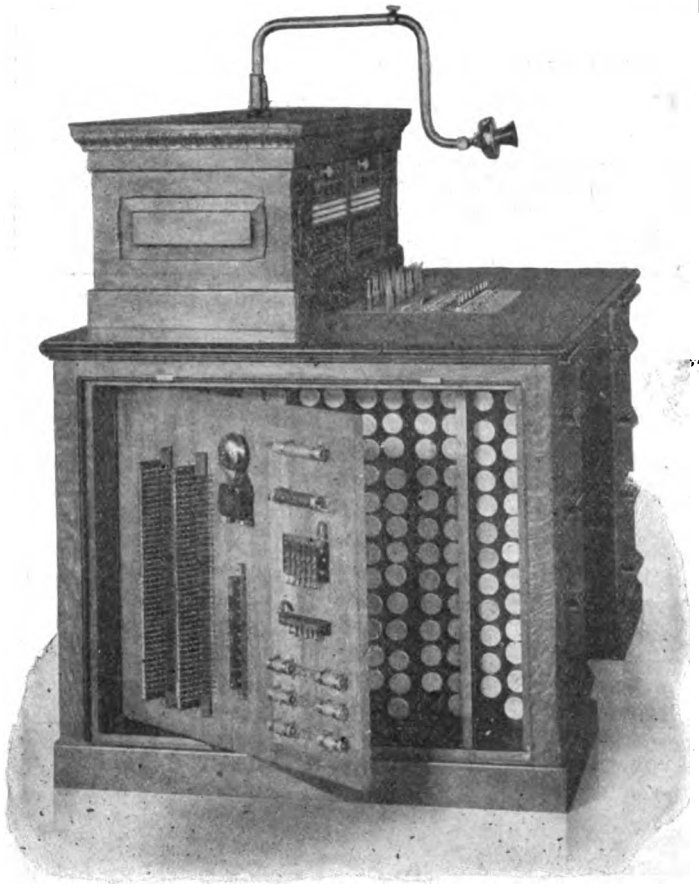

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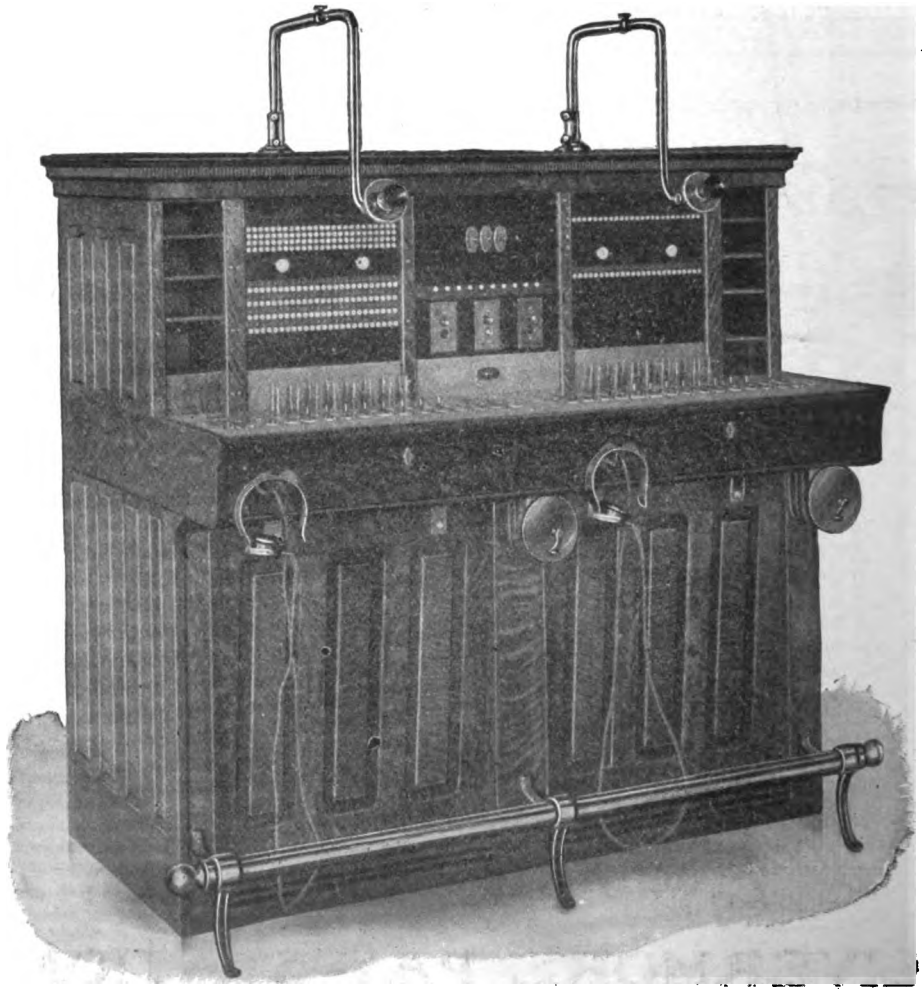

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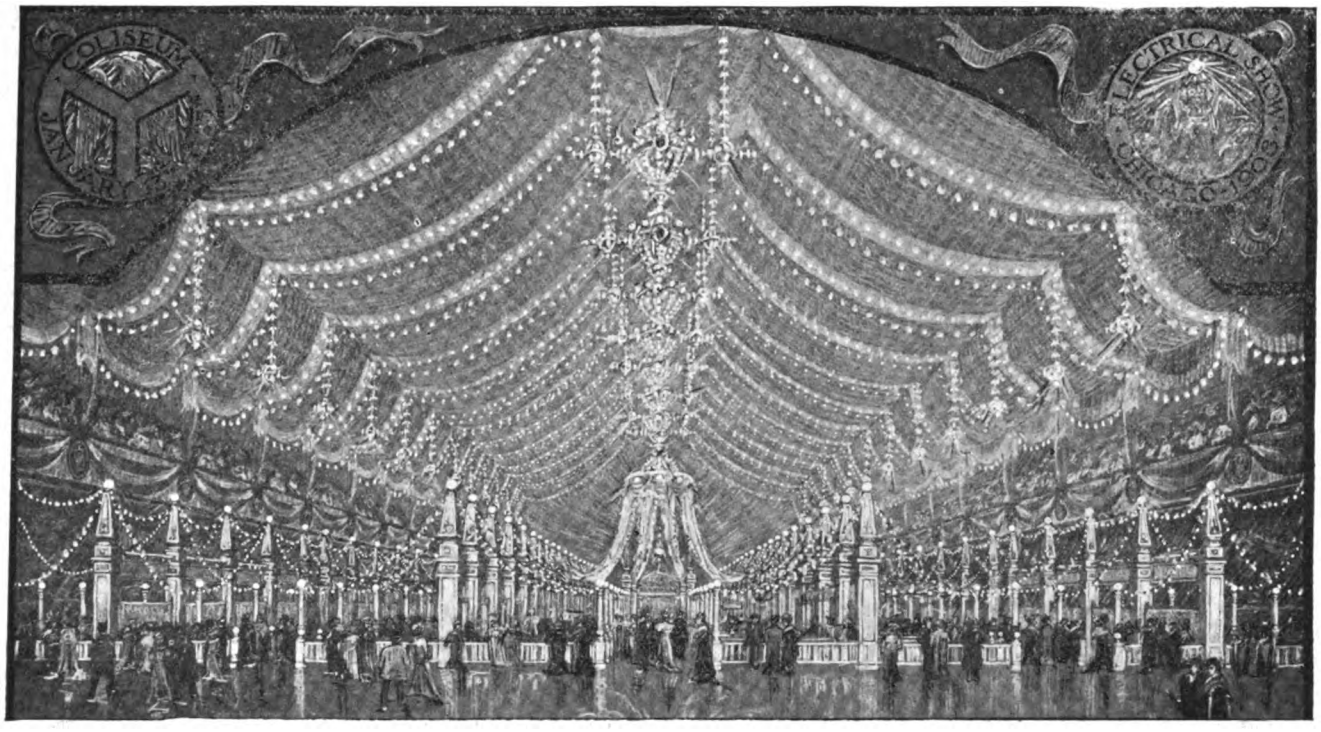
ELECTRICAL TRADES EXPOSITION, COLISEUM, CHICAGO, JANUARY 13-25, 1908



EXHIBITION OF EVERYTHING NEW IN THE TELEPHONE FIELD.
ANNUAL CONVENTION OF INTERNATIONAL TELEPHONE ASSOCIATION.
SECURE SPACE NOW. DON'T MISS IT. HOMER E. NIESZ, Manager, 1006-1007 Monadnock Block, CHICAGO

Have You Received Our Special Introductory Proposition?

For the progressive telephone operator we have an unusually favorable proposition to make in relation to our new model Livermore ONE SLOT Pay Station.

This new model combines all that is desirable and good in coin box construction, with all of the undesirable, trouble making, maintenance charge creating features eliminated.

There is but ONE SLOT into which the patron deposits the amount required for the connection. In this slot the coins are automatically directed into the proper channel to give a clear, individual signal indicating to the operator the denomination of the coins deposited.

All rattling of the coins in the coin chutes, with the attendant confusion to the operator, is absent, due to a special arrangement which is embodied in the Livermore only.

On the part of the patron no labor devolves other than depositing the coin specified by the operator in the ONE SLOT. No levers to pull nor special instructions to fuss over.

To the man that is desirous of giving a perfect class of pay station service to the public and of securing the greatest returns on the investment the instrument that will allow of these conditions is, as investigation will prove, the

LIVERMORE ONE SLOT PAY STATION

LIVERMORE PAY STATION CO., 4 BOWKER ST., BOSTON, MASS.

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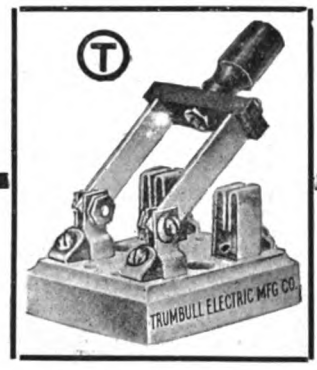
AT GREATLY REDUCED RATES



Self-adjusting clips held firmly in the recesses in the base insure a proper alignment and prevent loose, resistance introducing contacts. Selected high grade porcelain only used for bases. Each switch undergoes thorough test and inspection before leaving our factory.

THE TRUMBULL ELECTRIC MFG. CO.

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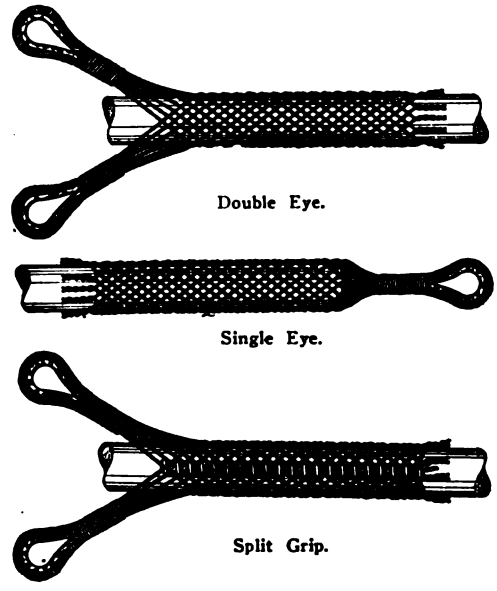
Universal Cable Grips

Absolutely the quickest, surest and cheapest device manufactured for the proper pulling of telephone cables.



Double Eye.

Single Eye.

Split Grip.

Can be attached to any cable in less time than it takes to cut and tie the old fashioned Marlin sling, with the further advantage that not one particle of the cable is injured.

WRITE TO-DAY FOR SAMPLE

Universal Cable Grip Company
SYRACUSE, NEW YORK

$67,085.00 saved

in the first cost of cable plant alone by the use of automatic equipment. That is the difference in estimates on a complete underground cable plant for manual and automatic equipment.

In a certain city of 100,000

the cable plant for a manual system would cost $200,000.00. The cable plant for an automatic system would cost $132,915.00. You may have our tabulation of these figures for the asking.

A saving of 33%

on cable plant alone is worthy of serious consideration. Couple with this the fact that there is also a saving of 40% or more on operation and maintenance expense and

The Automatic proposition

becomes something no live company can afford to pass by without investigation.

Automatic equipment has been adopted in the following cities:

Aberdeen, S. D.
Akron, Ohio.
Allentown, Pa.
Auburn, Me.
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Battle Creek, Mich.
Beaver Falls, Pa.
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Berkeley, Cal.
Billings, Mont.
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Houston, Tex.
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AUTOMATIC ELECTRIC COMPANY

VAN BUREN AND MORGAN STS. **CHICAGO, U. S. A.**

You must be sure to visit our exhibit at the Electrical Show, Chicago, January 18-25, 1908, Spaces 3, 4, 5 and 6, Section L, Coliseum Annex.

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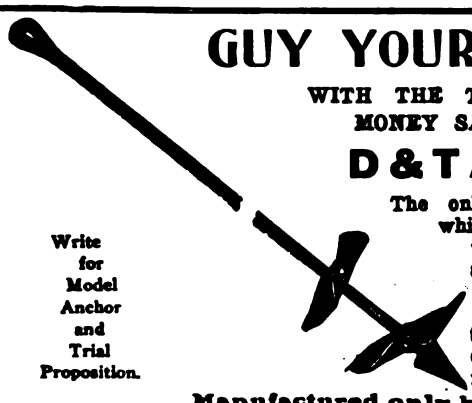
GUY YOUR POLES

WITH THE TIME AND MONEY SAVING

D & T ANCHOR



The only patent anchor which is installed without the aid of special tools.

Just drive and twist. Installed by one man in one minute.

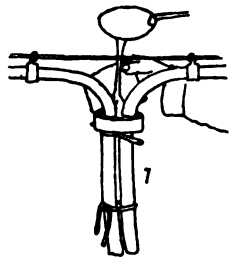
Write for Model Anchor and Trial Proposition.

Manufactured only by

THE VOTE-BERGER CO., La Crosse, Wis.

See our exhibit at the Electrical Show, Chicago, January 13-25, 1908.

A JOINT WITH ONLY ONE SOLDERED END



The advantages of this joint (which contains all of the principles of the horizontal joint) are simply explained in a booklet full of good information and containing 28 illustrations on cable construction.

Write for Free Booklet

W. N. MATTHEWS & BRO.

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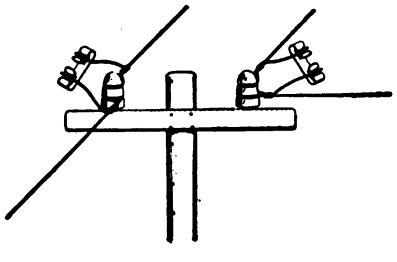

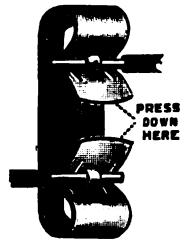

They can be readily fastened to or detached from the line at any time without the use of tools.

They provide a handy means for positive connection to test sets.
They grip the wire securely, giving positive contact at all times.
They have no nuts or threads to corrode and stick.
They are made for either Iron or Copper Wires.
They are economical to use.
Write us for free sample and uses.

Fahnestock Electric Company

129 PATCHEN AVENUE - - - BROOKLYN, N. Y.

Demand Fahnestock Clips on Your Dry Batteries

Do you want the best wire to be obtained for Telephone Service?

Use Roebling Hard Drawn Copper Wire

Do you want a cheaper wire which will last for years and give good service on lines of ordinary length?

Use Roebling Double Galvanized Telephone Wire

John A. Roebling's Sons Co., Trenton, N. J.

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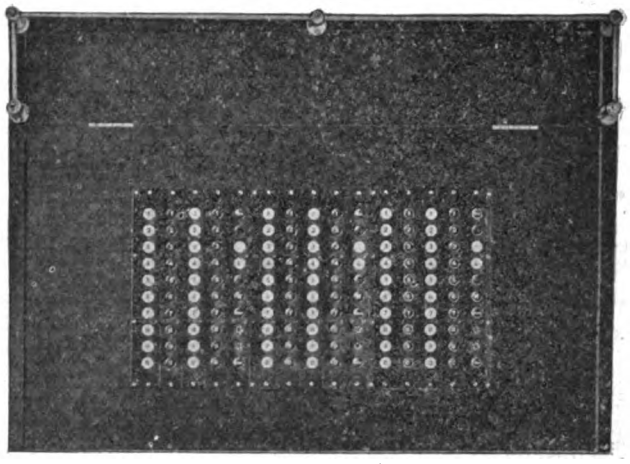

IF your operators had no other work to do but build up connections—

If the testing, ringing, supervision and disconnect were entirely automatic—

And there were no cords, plugs, jacks, supervisory signals and ringing keys to manipulate, think how much more work they would be able to accomplish.

The AUTO-MANUAL SYSTEM provides for this without added complexity to your telephone instruments, and without compelling your subscribers to manipulate awkward and unfamiliar machinery.

Are you interested? Let us tell you more about it.

The North Electric Company

DALLAS CLEVELAND KANSAS CITY

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STEEL WALL SETS

No wood work is used in the construction of this common battery instrument.

No exposed metal parts enter into the circuits, and special insulation prevents trouble and obviates any opportunity of the subscriber receiving a shock.

In size—5 3/16″x8 1/2″—it is the smallest complete instrument manufactured. The end of the mouth piece is only 6 1/2″ from the wall.

SEE "DEAN" BULLETIN No. 102
Metal Box Telephones

CODE NO.	*FINISH.	CIRCUIT.	CONDENSER.	RINGER.
1800	As Specified	Standard	1 M. F.	1000 ohm
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740-1	As Specified	4-party	1 M. F.	No. 1 Harmonic
740-2	As Specified	4-party	1 M. F.	No. 2 Harmonic
740-3	As Specified	4-party	1 M. F.	No. 3 Harmonic
740-4	As Specified	4-party	1 M. F.	No. 4 Harmonic

LOOK FOR THESE INSTRUMENTS AT THE ELECTRICAL SHOW

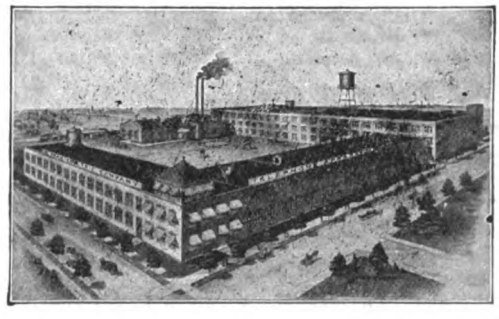
An Independent Telephone Plant

This is the title of our new

BROWN BOOKLET

which contains more general information than advertising. The Dean Electric Company is mentioned only twice.

SEND FOR IT



THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

BRANCH OFFICE: WATER WORKS BUILDING, KANSAS CITY, MO.

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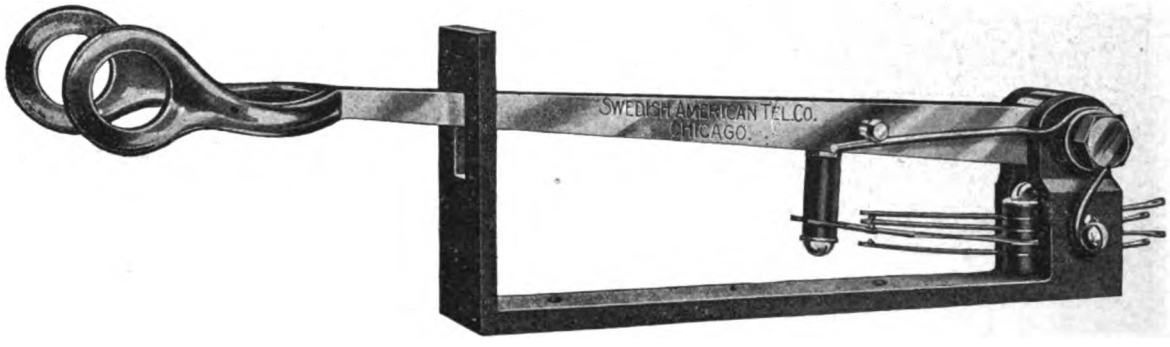
ALL OF THE WEAK AND DOUBTFUL POINTS ELIMINATED IN

SWEDISH-AMERICAN SWITCH HOOKS



The greatest care has been expended in the designing and selection of material entering into the construction of Swedish-American Hook-switches.

The contacts of platinum are permanently mounted in German silver springs of great length. By this combination no trouble is ever experienced due to loose contacts or loss of resiliency of springs.

A separate spring of specially tempered steel is used for the operation of the hook, so that no work of this nature is placed upon the contact springs.

The hook and frame are thoroughly insulated from the contact springs and do not in any manner enter into any portion of the circuit.

The self-contained, positive adjustment features and the accessibility for inspection of each individual part make Swedish-American Switch-Hooks ideal for perfect service.

Swedish-American Telephone Co.

Chicago, Ill., U. S. A., 1748-1772 East Ravenswood Park

PARENT COMPANY OF

BRANCH **Kansas City, Mo.** 113-115 West 6th Street

DOMINION TELEPHONE MFG. CO., Ltd. TORONTO, CANADA

BRANCH **Sioux Falls, S. D.** 300-304 N. Phillips Avenue

See Our Exhibit—Chicago Electrical Show—January 13-25, 1908

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The American Telephone Journal

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VOLUME XVI. SATURDAY, DECEMBER 28, 1907. NUMBER 26.

Rules for Operating Room Employees

A Complete Set of Instructions and Rules for the Government of Local Operating Room Employees.

COMPILED BY KENDALL WEISIGER.

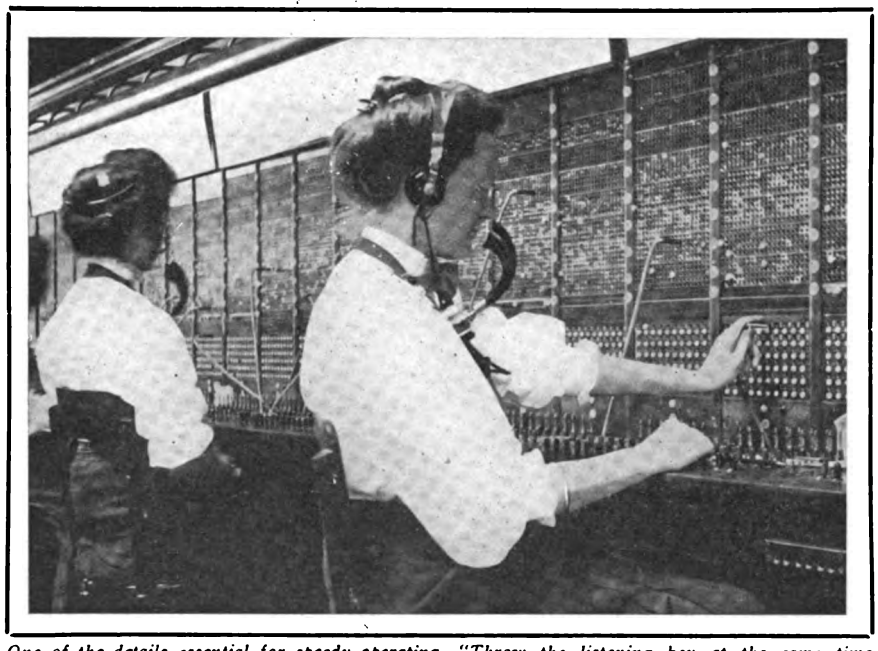
Illustrations from special photographs by John Putnam.

AS the majority of operating errors occur in connection with the handling of calls over call circuit trunks, operators should be especially careful in handling these calls. Errors will arise from these sources: First, from pressing the wrong call circuit button; second, from taking the wrong trunk; third, from taking a trunk to the wrong office.

¶Trunk operating errors can be reduced by marking the call circuit buttons and by plainly marking the outgoing trunk jacks, no expense should be spared to make such markings as clear and useful as possible.

Failure of Calling Circuit.—If no response is received after passing a call to a distant "B" operator, repeat the call a second and third time; if no response is then received, notify your supervisor at once, and she will, if necessary, take steps to establish a temporary calling circuit.

Changing Cords on Trunk Connections.—If it became necessary to change cords on a trunk connection, notify the "B" operator before making the change, by saying, *"I am changing my cords on two, three."* This will prevent the "B" operator from disconnecting.



One of the details essential for speedy operating—"Throw the listening key at the same time that the plug is being inserted into the jack."

DISCONNECTION.

(a). In common battery offices, when the supervisory signals show that both subscribers have finished their conversation disconnect them without listening in, removing the front cord first.

(b). In magneto offices, when the clearing out signal has been received, go in and say, *"Are you waiting?"* twice; if no reply is received, make the disconnection.

(c). In making connections and disconnections, operators must be careful not to push or pull the plug by means of the cord. Take hold of the plug by its shell and remove it from the jack, restoring to its socket without dropping it. If the plug cannot be conveniently reached, shake the cord to the neighboring operator, who will remove the plug for you.

¶The improper handling of cords is a proposition which has confronted the maintenance department for a long time. Central office managers have been implored to improve the conditions without much effect. The claim is often made that service is paramount, and that during rush hours operators cannot be required to handle cords in the prescribed way, which is good reasoning. This, however, should not deter us from training operators in the proper methods of handling cords. It should be impressed on them that they should be careful for their own safety, if for no other reason, as cases have arisen where operators have lost the use of an eye by being struck with a plug jerked out by a neighboring operator. Such accidents are due to the springy nature of the steel cord.

ANSWERING SUPERVISORY SIGNALS. (COMMON BATTERY OFFICES.)

(a). If the operator *knows* that the called subscriber has answered, and either of the supervisory signals operate intermittently, she shall say, *"Number,"* If the subscriber on the front cord asks for a connection, say to him, *"I will connect you with your operator,"* and take down the connection. This will allow the call to be answered by the operator who regularly serves his line.

¶This action requires less time than to remove the front cord and insert a back cord; furthermore, the interval between change of cords will be marked by a flash of the line lamp, which will possibly cause another operator to get in on the connection. This is especially true if the front cord is far up in the mul-

EDITOR'S NOTE.—This is an actual set of working instructions for a traffic department. Supplementary notes inserted for the information of telephone men who are not operating experts, or to explain doubtful points, but not properly included in the actual working copy, are contained in paragraphs preceded by the sign (¶). Begun in the issue of Nov. 16.

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tiple, requiring a long reach to make the change of cords.

When both flat rate and message rate subscribers are served, this course is necessary in order that the calls may be recorded by the operator who regularly answers the line, otherwise the message rate subscribers would not be charged for calls originating under this condition.

(b) If the supervisory signal operates intermittently on the answering cord when the operator *knows* that the called subscriber has *not* answered, she shall go in and say, *"Operator?"* with the rising inflection.

(c) If in doubt as to the exact state of the connection, answering by saying, *"Operator?"* If no answer is received after repeating the question a second time, take down the connection.

¶ The question of selecting the proper expression to be used in answering supervisory signals has been a difficult one to solve and there have been many different solutions of the problem. The fewer expressions to be used in this connection the better, and it is felt by some that the one expression *"Operator?"* will fit all cases. It is a natural expression and is the one which would suggest itself to an operator who had not been instructed on this point. The word *"Central?"* is really the more natural, but the other is considered by many persons to be more dignified and businesslike.

DISCONNECTION ON ONE LIGHT.

(a) On incoming ring down trunk connections, when the back supervisory remains inoperative and the front supervisory operates after the subscriber has answered, go in and say, *"Operator?"* twice; if no reply is received, take down the connection. If the distant subscriber wants another connection, say to him, *"Call your own operator, please."*

(b) After an outgoing connection has been established over a ring down trunk, should the back supervisory operate, go in and say, *"Operator?"* twice; if no reply is received take down the connection.

ANSWERING CLEARING OUT SIGNALS. (MAGNETO OFFICES.)

(a) As there are no automatic signals on magneto cords to show the state of the connection, it will be necessary for the operator to see that the called subscriber answers, by listening in until the conversation is commenced.

(b) Within thirty seconds after ringing the subscriber, if it is found by listening in that he has not answered, or if the clearing out signal falls, go in and say, *"I am ringing four five six."*

(c) After a second ring, if a reasonable time has elapsed and no reply has been received, say to the calling subscriber, *"Four five six don't answer."*

(d) Upon answering the clearing out signal, if no reply is received, or if the operator is in doubt as to the state of the connection, go in and say, *"Are you waiting"* If no reply is received, say *"Are you waiting?"* a second time before taking down the connection.

(e) As subscribers frequently fail to ring off at the end of a conversation, it will be necessary to occasionally listen in, in order to insure prompt disconnection. In doing this, listen carefully before speaking, to avoid interrupting a conversation. If no conversation is heard, ask *"Are you waiting?"* before disconnecting, in order to prevent cut-offs.

(To be continued.)

ELECTRICAL INSPECTION FROM THE TELEPHONE MANAGER'S VIEWPOINT.*

By Charles M. Mauseau.

THE fundamental principle of inspection is to insure the highest care in the protection of the lives of the public, of employees and of the property of the company. So from this consideration of the subject it is plain to be seen that the electric company and the telephone company can start hand in hand and co-operate to gain the end which both believe in and which is to their mutual interest. Certainly our first thought should be the protection of human life, and, looking at the matter from a purely business viewpoint, I could state to you gentlemen here that I have signed sufficient vouchers for damages to men who have been injured by reason of defective work and lack of inspection of completed work during my position as general manager to warrant me in saying that I believe it to be economy to have a thorough system of electrical inspection.

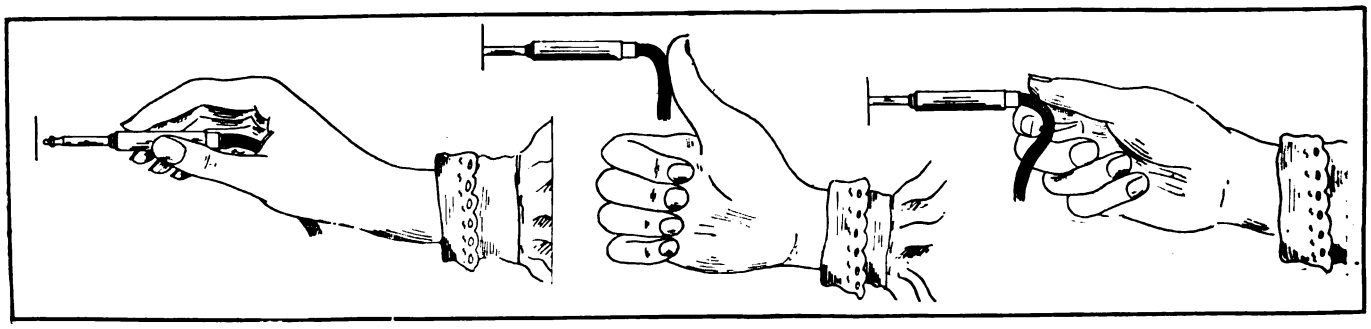
When your association or a member of your association is requested to make recommendations by a municipality as to what changes should be made in the existing plant of an operating company it is advisable that before you tell them that every part of the plant should be placed underground, you should consider what the life and value of the present plant is, and look at it from the viewpoint of the owning company. There are but few companies which, if allowed to make use of their present plant for its natural life, would not be willing to allow the electrical inspector to dictate how the renewal should be made, and in view of the fact that the municipality has allowed the company to construct an aerial plant, they should allow it to use that plant during its natural life. This is a point which, to my mind, the electrical inspector should consider very carefully.

As I understand the code adopted by the association, it is the consensus of opinion of experts employed by the insurance companies in an endeavor to safeguard their interests and to minimize the risks from the electrical hazards. I do not pose as an electrical expert, but I do believe the rules and regulations as laid down by people who know are beneficial, both to the insurer and to the insured. One writer claims that the rules in the code have no legal status, but I know personally that many lawsuits have been decided on the question as to whether or not the rules of the code were complied with, and, as you gentlemen know, there are few ordinances relating to electrical inspection now passed by municipalities which do not refer to and cite the code as adopted by the Western Association of Electrical Inspectors.

The constant increase in the use of electricity, the increase of potential and the means of conveying the electrical current has increased the fire hazard to such an extent that the value of an inspection by unprejudiced experts cannot be overestimated, and by an unprejudiced expert I mean the man employed by the insurance companies.

My experience shows that all telephone plants are classed the same by insurance men, but I contend that a properly guarded telephone plant, up to specifications, is entitled to and should be given a lesser rate than a poorly protected plant.

*Abstract from a paper presented at the annual meeting of the Western Association of Electrical Inspectors in St. Paul, Minn., October 23, 1907. The author is general manager of the Northwestern Telephone Exchange Company of Minneapolis.



Proper Way of Inserting and Removing a Plug. *Improper Way of Inserting a Plug.* *Improper Way of Removing a Plug.*

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It was only a few years ago when the question of joint occupancy of a pole line by a telephone company and an electric light company would not have been considered on the part of the telephone company, but the advent of two telephone companies in the field and the multiplicity of pole lines on one route has made it absolutely necessary for someone to "double up," and so far we have found it easier and more practicable to join with the electric companies than for two telephone companies doing a local business to make use of a joint pole line.

I wish to state that I believe it to be an impossibility for a municipality to force two telephone companies and an electric company to make use of one joint pole line, but do believe it is possible for one telephone company and an electric company to use jointly one line of poles; but remember this in your recommendations, don't ask three companies to use one pole line unless you can draw a diagram of how to make distribution from a joint pole without interference.

There is one criticism I wish to make of your printed code, and that is that it does not explain as fully as it should the why —the reason—for your rules, and this especially refers to those rules which apply to wiring in buildings. It is the custom with telephone companies and most wiring companies to instruct their apprentices on this class of work, but if your code and our instructions would explain more fully why work should be done in the manner prescribed, it would not be so necessary that we instruct them (in detail) how it should be done, for they themselves would soon learn to figure out the proper methods and adopt them if the purpose for doing so were brought clearly to their understanding.

NEW YORK CENTRAL LINES FURNISH TICKETS UPON RECEIPT OF TELEPHONED REQUESTS.

SPECIAL facilities of various kinds are being constantly devised to suit the convenience of persons who are to have an opportunity to travel over the New York Central Lines. One of the most recent improvements in such matters has been the introduction of a system by means of which a person may telephone to the main ticket office and have tickets delivered immediately to his residence or place of business.

This plan was first tried out in New York city and Brooklyn. The idea there is to have the intending traveller call No. 5680 Madison, which is the City Passenger Office in New York City, 1216 Broadway, this being the headquarters of Mr. L. F. Vosburgh, General Eastern Passenger Agent. The agent in charge of this service at the headquarters receives over the wire the name of the city for which tickets are required, the number of tickets and a statement of what Pullman accommodations are needed. A passenger agent is immediately sent with the necessary tickets, from either the headquarters' office or the nearest branch ticket office, a considerable number of which are located throughout the city, all being connected with the office at 1216 Broadway by private telephone lines. As one of these ticket offices is located in each of the important downtown business districts, and some are convenient to the transportation lines by means of which rapid transit may be obtained to up-

At Your Office, Home, Hotel or Club
Railroad tickets and Pullman accommodations may be secured by dropping a card to L. F. Vosburgh, G. E. P. A., 1216 Broadway, or by telephoning 5680 MADISON and representative will call and make all necessary arrangements.
NEW YORK CENTRAL LINES
DON'T LEAVE HOME
to arrange for your railroad ticket and Pullman accommodations. If you will
TELEPHONE 5680 MADISON
or drop a postal card to L. F. Vosburgh, G. E. P. A., 1216 Broadway, New York, a representative will call at your home or hotel and make all necessary arrangements.
This is one of the many conveniences provided for the patrons of the
NEW YORK CENTRAL LINES
Railroad Tickets
—AND—
Pullman Accommodations
can be arranged for at your home, hotel, club or office by dropping a card to Mr. L. F. Vosburgh, G.E.P.A., 1216 Broadway, or by telephoning 5680 MADISON, and a representative will call and make all necessary arrangements.
NEW YORK CENTRAL LINES

town streets, it takes but a few minutes to reach any part of the city from which a call may be received.

The passenger agent who delivers the tickets to the customer is a man who is prepared to give any desired information regarding train service or the planning of itineraries for those who contemplate a journey of any length, or who find it necessary to change to another railroad en route. The company has found, as was expected, that this service has proved to be a great aid to business men who have not time to leave their offices, and also to strangers who are stopping at the hotels, and especially to ladies, who may in this way avoid the necessity of a trip down town. The success of the plan in New York has led to its adoption in all of the large cities served by the New York Central Lines.

This new service has been made the subject of some interesting advertisements, three examples of which are reproduced herewith by courtesy of Mr. P. V. D. Lockwood, of the New York Central Lines Advertising Department. It will be seen that in each case the feature of the telephone service and the number 5680 Madison, assigned to the City Passenger Office, are prominently featured, so that this system is undoubtedly a means of increasing the business of the telephone company, as well as that of the railway.

Requirements of Sub-Station Wiring

By Ralph S. Bayley.

MANY points affecting the character of their work must be borne in mind by the men who put in telephones on the premises of subscribers. When one attempts to cover the ground thoroughly he speedily realizes that any form of verbal instruction cannot be completely satisfactory to the men at the head of the installing department, any more than to the installers themselves. The writer has found that a set of explicit instructions accompanied by blue print diagrams are of the greatest use, both in respect to aiding installers to learn in a short time how to do their work, and in furnishing them a standard which tends to maintain the proper quality of methods and workmanship. The instructions issued to the installers of the Interstate Telephone Company, of Trenton, N. J., cover briefly the points outlined in the following article.

Some of the most important duties of the installer are not strictly related to the actual work of placing instruments. His general conduct on subscribers' premises, and attitude toward the company embrace a considerable number of questions upon which he is open to suggestion. When changing his place of residence an installer should notify the office of his superintendent, giving both his address and the number of the nearest telephone by which he can be reached in case of emergency. When compelled by reason of sickness or other disability to be absent from duty the office should be notified by mail or telephone on the first day of absence. Installers must on all occasions abstain from any behavior prejudicial to their own or the company's reputation; smoking in subscribers' offices, shops or dwellings or in the office is prohibited.

Company's documents, orders, circuits, etc., are private property and should not be exhibited to those not entitled to inspect them; nor should installers give out information about or comment upon the company's business to those not properly interested. They should refer all persons desiring information as to rates, etc., to the Contract Department of the division in which they are located. Matters pertaining to the company's interest, whether in the direct line of installing or not, which may come to the attention of the installers, should be reported to their superior officer.

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Before starting work at a subscriber's place of business or residence, an installer designs the run of wires, etc., and should explain to some one in authority what is proposed, so that a satisfactory understanding will exist and cause for complaint be avoided.

It is an unwise thing to empty nails, screws, cleats, etc., on a carpet, desk, chair, table, couch or bed. Place a newspaper on the floor where it will not interfere with the passage of persons.

Wire that is being run must not be left lying about in a careless manner; a man ought to keep it close to the work.

Unnecessary conversation with persons at sub-stations should be avoided, but this does not mean that a man should refrain from answering such questions as he feels authorized to answer, or referring inquiries to the proper authority.

The practice of making ringing tests with a switchboard operator in offices where a test table operator is on duty is always prohibited. All tests desired by installers must be made with the testing table operator. Conversation with switchboard operators must be limited strictly to that necessary in making connections.

Arrangement of the wires and fastenings should be made in a manner that will make them least conspicuous, and secure their most economical installation.

It is always advisable to call the attention of someone at the sub-station to the presence of the directory after new issues have been made to avoid the complaint that none was delivered.

After a connection has been completed, the installer should explain fully to the subscriber the proper method of using the telephone, and on party lines caution the subscriber not to remove the receiver from the hook until the bell has stopped ringing. After completion of work all dirt made by boring, drilling, removing insulation from wires, etc., should be carefully cleaned up.

When installers have connections to make to terminals in house or underground cable boxes, they must remove all particles of insulation, solder or wire that may result from their work. If boxes are found in imperfect condition, a report on defects should at once be made in writing to the wire chief.

Should an installer have an order for residence service and learn upon arrival at the subscriber's place that it is intended for use in connection with any business, he must not complete the work, but without comment to the subscriber proceed with other work upon which he may be detailed, and notify his superior officer of the fact.

When working at subscribers' stations if it is necessary to cut an instrument out of service, before doing so the testing table or wire chief at the office where the line terminates should be notified; and upon closing the line notification should be given

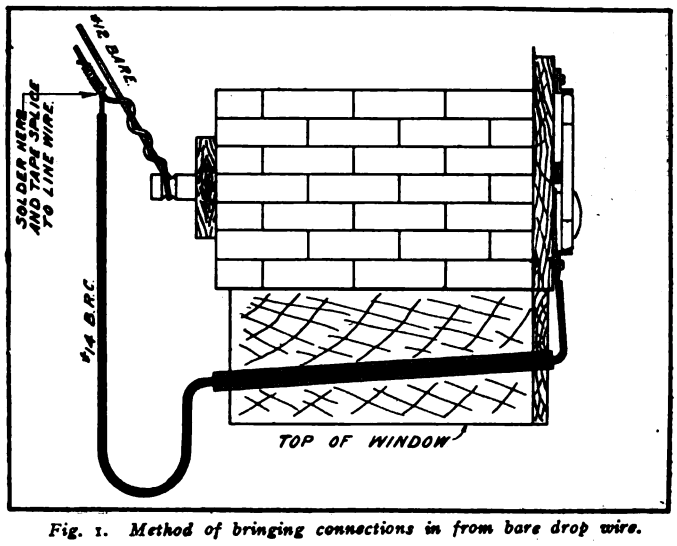

Fig. 1. Method of bringing connections in from bare drop wire.

to the wire chief and his O. K. on test received. The final O. K. test must not be asked for until all work is complete and ready to leave, with doors closed and connections made permanent.

When a bogus instrument is found or foreign attachment is made to the company's lines, the circumstance is to be reported to the wire chief.

When trouble is located on outside wires, it is not allowable to leave the instrument "cut out"; the right procedure is to connect it through, reporting the circumstances to the testing table operator. Installers are held responsible for any irregularities found upon inspection after completion of the installation.

All line orders must be endorsed with the amount of material used, time consumed and expense incurred.

When making disconnections the men should be as agreeable in manner as possible. Should any question arise, reference to the office for advice in the matter should be made. When removing inside wires on a disconnection, care must be taken to prevent any cause for complaint due to bad workmanship. In making a disconnection on a party line, care must be observed to see that the remaining subscribers on the line are not affected by the cutting out of the instrument. If a man detailed to make a disconnection finds the instrument "cut out" of service the proper course is to remove the instrument, protector wires, etc., and report the disconnection to the testing table as soon as possible. All material recovered from disconnections must be

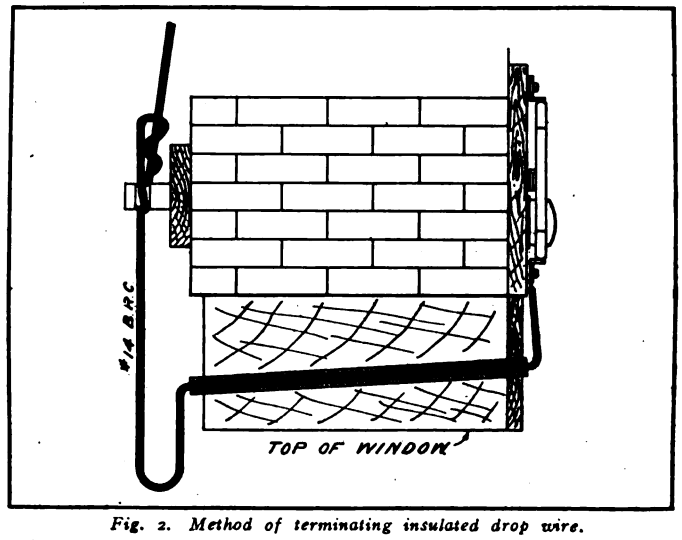

Fig. 2. Method of terminating insulated drop wire.

removed from subscribers' premises. In placing pay station signs they should be located where they will be most likely to attract the attention of the public, with the approval of the subscriber and consistent with municipal regulations. The bottom of all signs extending from a building must be not less than eight feet above the sidewalk.

When in doubt about matters that do not present themselves clearly, an installer should make it a rule to confer with his superior, who will extend such information as is desired for a better understanding of the matter. Any information to further the interests of the company will always be given, and it is expected of all employees that a careful study of the typewritten instructions given them will be made, so that at any time they are called upon to carry them out they will be proficient.

The following rules have been found to cover the installation of drop wires to a sufficient extent to insure good work: All telephone wires not in cables leading into sub-stations are considered by the National Board of Fire Underwriters as high tension wires as far as the protector. Consequently, these wires must be of No. 14 B. & S. gauge copper, insulated with a covering of rubber compound up to a thickness of .165", the whole covered with a single braid saturated with a weather-proof compound. These drop wires are to be securely fastened to the outside of the building by means of heavy knobs and screws, and left long enough to project through the window casing and up to the protector. Generally speaking, about six feet of wire should be left. The drop wire must be run through the window casing in tubes of approved insulating material. In boring the holes through the window casing for the tubes they must be bored so that they will have a slant downward of about

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one-half inch in six toward the outside of the building. This will prevent water from dripping through the tubes into the building. The tubes must be cut long enough to allow a projection of about one-half inch on the outside of the window casing, and must be cut of the requisite length for the casing on the outside. Just before the drop wires reach the outside ends of tubes they are to be bent into a drip loop, to prevent water from following the wires into the building. The holes for the tubing must be bored not less than two and one-half inches apart, nor more than five inches. (See Fig. 1.) The drop wires always must run directly to the posts marked line on the protector. If the drop is run before the instrument is installed, six feet should be left coiled on the end of each wire

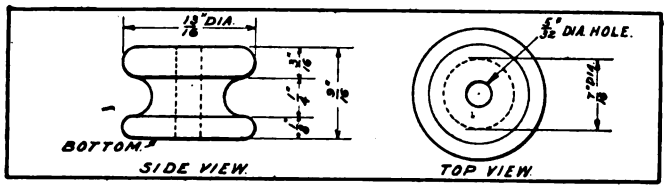

Fig. 3. Porcelain knob for mounting leading-in wires.

to run to the protector when the instrument is installed. In residence districts, if the drops are run with bare wires, they must be dead ended on knobs and an eight-inch tail left projecting. The leading-in wires to the building are to be of the regular style No. 14 rubber covered and braided drop wire, run from the protector and connected with the tail of the bare drop wire by means of a Western Union joint, thoroughly soldered. (See Fig. 2.) A hard drawn copper wire under strain must never be heated, and all soldered joints should be made to projection tails, otherwise trouble from broken connections is liable to result.

The leading-in wire as far as the protector is considered as a high tension wire, and must be insulated according to the requirements of the National Board of Fire Underwriters. These leading-in wires must therefore be separated by at least two inches and mounted on knobs of the style and dimensions shown in Fig. 3. These knobs are intended to be attached to the walls by means of one and one-half-inch No. 6 R. H. wood screws. Care must be taken that the leading-in wires in no place touch the window casing. Where possible the leading-in wires must be brought to top of the window frame, and the protector placed directly above the casing.

(*To be continucd.*)

SLATE BELT TELEPHONE COMPANY ACQUIRES NEW LONG DISTANCE FACILITIES.

BY making connections with the Pohoqualine and Stroudsburg & Bushkill Telephone Companies a few days ago the Slate Belt Telephone Company, with headquarters at Nazareth, Pa., made it possible for its subscribers to reach a considerable amount of new territory. The Pohoqualine Telephone Company controls the telephone service at Bossardsville, Snydersville and other northwestern parts of Monroe county, while the Stroudsburg & Bushkill Telephone Company, with headquarters at Stroudsburg, has extensions to Mt. Pocono, Bushkill, Delaware Water Gap and Port Jervis. The extension of the Slate Belt Company's system in this manner gives important new facilities to its subscribers, and it is expected that a considerable increase in business will be an early result of the new opportunities for reaching neighboring counties.

THE DIFFERENCE between the Independent Telephone System and the Bell Corporation on the rate question is this: The Independents prefer to start with a reasonable rate that is equitable for the amount of service furnished, and advance the rate as the list of subscribers and the value of the service increases, while the Bell prefers to start with an exorbitant rate and decrease it as its list of subscribers decreases, until, as happened in a number of places, it has neither rate nor subscribers.—*Bulletin of the Indiana Independent Telephone Association.*

NASHVILLE OPEN FIELD FOR INDEPENDENTS—CONTRACT FOR EXCLUSIVE BELL SERVICE RESCINDED BY CITY GOVERNMENT.

THE city council at Nashville, Tenn., has at last rescinded its agreement with the Cumberland Telephone and Telegraph Company (Bell), and will no longer accept the $10,000 per year from that company for the consideration of an exclusive field. This is another victory for the Home Telephone Company which has been trying for three years to get into Nashville. Each year the city council, under the influence of the Cumberland company has blocked the way of the Independent company, but it is now practically certain that the company will get what it asks of the city and will begin work on its system at once.

The resolution rescinding the agreement with the Cumberland company was passed by the council by a vote of 21 to 2, all efforts to prevent the passage of the resolution resulting in the same vote. Numerous other bills and resolutions were offered to prevent the action but each time 21 aldermen remained firm. Mayor Brown signed the bill as soon as it reached his desk.

In an opinion called for on this specific case City Attorney McAllister stated the Talbert Law, passed by the last legislature giving all telephone and telegraph companies use of the streets and alleys of cities without the consent of the city council, necessarily rescinded the agreement the city had with the Cumberland company, but the council thought it wise to dispose of the case its own way. A bill will now be introduced giving the Home company a franchise and allowing it to use the conduit system being installed by the other wire using companies, over which the city has general control. Unquestionably this bill will be signed by Mayor Brown and the fight of the Home company for a living chance in Nashville will be ended.

The Cumberland company some time ago attacked the constitutionality of the Talbert Law, but has been defeated in each of the lower courts. The case has been appealed to the Supreme Court, and that body will act on the case early in January. The Supreme Court is now in session, but adjourned until January 8 on account of the holidays and will not hear the arguments in the case until about January 10. Whatever comes of this law, however, the Home Telephone Company will get its franchise in Nashville, having the mayor and twenty-one aldermen decidedly in its favor.

Rescinding the contract by which the Cumberland company has been paying the city $10,000 per year "as long as the city did not give any competing company a franchise," leaves the telephone companies of Nashville free from any tax whatever to the city. This will last but a brief time, however, as a bill is already in course of preparation providing for a tax of 3 per cent. on the gross receipts of the companies. The Cumberland company has its headquarters in Nashville and was the first company to install an exchange there, many years ago. Since that date the company has paid the city no privilege taxes until the contract was made in 1905 to pay $10,000 per year for a clear field.

Mayor Brown has expressed his strong determination to stop free privileges and will put through a law requiring 3 per cent. of gross earnings as a privilege tax, making it apply to all companies. The Home company has agreed to this law, but the Cumberland company will fight it. The street railway, light, gas and other public service corporations of Nashville are now paying this character of tax and the mayor insists upon it applying to telephone companies also. The Cumberland company has about 8,000 telephones in use in Nashville.

WANTED—ADDRESS OF HARRY WORTHINGTON

THE address of Harry Worthington, last heard of in Oklahoma, is wanted. His father is seriously ill. Anyone in a position to furnish information concerning his whereabouts kindly telegraph E. H. Martin, Webster City, Iowa.

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In the Operating Field

HOLDEN HOME TELEPHONE COMPANY'S SEVEN YEARS OF SUCCESS.

A FEW years ago Holden, Mo., was practically without telephone service, because the Bell company had believed that it was unable to make a profit on its plant at the high rates it was charging, and had practically abandoned the place. In December, 1900, an Independent company was organized by G. H. Scheidenberger, R. L. Jurden and M. L. Golladay, and a plant was installed to take care of one hundred telephones, forty of which were installed at the time of beginning operations. It was not long before a new board had to be put in with a capacity for three hundred telephones, and soon after that a demand for connections into the surrounding territory caused lines to be built out to neighboring towns. From the very first the growth of the company, under the active management of Mr. Golladay, has been rapid and satisfactory. A year ago it was recognized that business warranted the installation of the very highest type of central office equipment, and this month sees the completion of the installation of common battery apparatus. The people of Holden are proud of the growth of this company, which derives its whole strength from local support, and which on account of the confidence felt in the community has been able to show a growth from forty telephones to over 1,200, with lines extending to nearly twenty separate towns and villages.

DIFFICULTIES OF WINTER TROUBLE SHOOTING IN THE ROCKY MOUNTAINS.

FEW men who work on city telephone systems have any appreciation of the difficulties met by the men who have to work in bad weather on mountain lines. In this connection the following item from the *Herald*, a Salt Lake City newspaper, is interesting:

"One of the men employed by the Rocky Mountain Bell Telephone Company was sent on the Alta line yesterday to "shoot" trouble on the wire between here and the Cottonwood mining camp. He left yesterday morning and shortly afterward it began to snow. Storms of a very mild character here are raging tornadoes in the mountains and the storm yesterday was one of this sort. When the man, Henderson, got on the line, he began his work and kept in hourly touch with the office in town, but about 4 o'clock he stopped calling in and the manager became alarmed lest the man had got lost in the snow. Accordingly a party was sent out and no trace of the man was found all night. However, this morning Henderson turned up near Alta. He had got lost and reaching a cabin had stayed in there all night out of the storm. He got lost as soon as it began to grow dark and luckily found the cabin. He returned this morning very well satisfied with his experience."

INTERNATIONAL ASSOCIATION FURNISHES NEWSPAPERS WITH ABSOLUTE DENIAL OF ANY POSSIBILITY OF COMBINATION OF BELL AND INDEPENDENT COMPANIES.

THE Publicity Department of the International Independent Telephone Association has furnished to fourteen hundred representative newspapers in the United States and Canada an authoritative statement of the attitude of its members toward any project for the merging or connecting of Independent and Bell lines, about which there has been some gossip in the newspapers. Attention is called to the fact that the attitude of the Independents is firmer than ever. President Gary, of the International Association, is quoted as saying:

"We have been fighting too long and have had too much uphill work against every obstacle the ingenuity of the opposition could suggest to receive any conciliatory advances from this same opposition with a degree of favor or acceptance of good faith. The coming convention will go on record strongly against any work along lines suggesting co-interests of the two great telephone organizations. At the outset of our efforts to establish competition, which is the true foundation of commercial and industrial prosperity, we were denied recognition of any sort, and had to contend with all sorts of legal warfare and regular trust methods of interference, interruption and attempted destruction. As we grew there came patronizing offers of concession, until more recently the bars have been let down, their principal manufacturing concern opens its doors to the world's market, something denied absolutely until within the past few months, and long distance connections are offered practically on the terms of the Independent companies."

Attention is called in this article to the tremendous strength of the Independents throughout the country, which makes it possible for them to refuse any overtures, and to continue in open competition with advantage both to themselves and the communities which they serve. Claims which have been established by well known facts, and which are familiar to all telephone men, are reiterated; namely, that the Independent movement has been responsible for the tremendous growth in the number of telephones in use, owing to active methods of getting business under the stress of competition, and that this is particularly true in relation to the extension of the telephone into rural districts. At the present time, although it is stated that the Bell company has the advantage in the operation of the extremely long through lines, the Independents in many parts of the country have an actual superiority in facilities for handling toll business, owing to the greater number of short haul circuits, this being the class over which 90 per cent. of the long distance business of the country is transacted. So strong are most of the Independent companies to-day that even under present financial conditions money for improvements and the development of new territory has been obtainable by Independent companies which are well entrenched and locally owned, where other corporations have been absolutely unable to finance extensions.

INDIANA COMPANY CUTS OUT BELL LINES RATHER THAN LOSE INDEPENDENT SERVICE.

AT Hope, Indiana, the Independent Telephone Company some time ago entered into an operating agreement with the Central Union (Bell) company. In doing so it violated a previous contract with the Citizens' Telephone Company of Columbus, a town nine miles distant. A damage suit against the Independent Company of Hope was brought by the Citizens' Company, based upon the breach of contract involved in the operating agreement with the Bell company. The suit has now been dismissed on account of an agreement which has been reached between the two companies to continue the service, as rather than give up its Independent connections the company at Hope has decided to cut the Bell lines out of its switchboard.

MORE BUILDING OF FOREST RESERVE TELEPHONE LINES.

FROM Spokane, Washington, comes an announcement by A. E. Harris, deputy forest ranger in the Palouse National Forest, southeast of Spokane, that next year a new line is to be built from Palouse to the Ohadi ranger station, a distance of seventeen miles. In the Elk City district, with headquarters at Elk City, Idaho, M. J. Durant has thirty men at work on the middle fork of the Clearwater river building a trail, and constructing a telephone line. This line will continue east to Dixey and back to Elk City, and will there connect with an Independent telephone line. Other building is in progress in the Bitter Root forest reserve, east of Spokane, and before long seven trails, varying from four to seventeen miles in length, will be opened on the eastern slopes of the Cascade Mountains. These new trails will open up a large territory, and will be of vast benefit to the settlers in central Washington.

The use of the telephone is found to be not only of great advantage to the Forest Service in fighting fires, but is a con-

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venience to the public generally. The Forest Service lines are put at the service of the homesteaders free of charge after connection is made, the only cost being that of the instrument and the putting up of wire from the main line of the forest service to the homesteader's cabin.

MARYLAND TELEPHONE COMPANY AT BALTIMORE CONSOLIDATED WITH BELL.

THE Maryland Telephone Company which some time ago passed into the hands of interests falsely announced to be Independent, has been combined with the Chesapeake and Potomac (Bell) Telephone Company.

A FAMILIAR NEWSPAPER HEADING: "SOME FARMERS ARE SORE."

IT is reported from Sacramento, Cal., that there is considerable dissatisfaction among the farmers of Florin and Elk Grove over the fact that their telephone system formerly held by the Farmers' Telephone Association, has been consolidated with the Sunset Telephone Company's (Bell) lines. The story of these farmers is a common one. Some years ago they got together realizing the advantage to be gained from an inter-neighbor telephone system and strung a few lines. Later these were connected together at the central point and a very satisfactory service was given throughout the immediate neighborhood. Soon after the farmers' ambitions rose and they desired to talk with the business interests in Sacramento, and in order to do so connected their lines with those of the Capital Telephone Company. This company afterward proved to be a part of the Bell lines and was taken over by the Bell company. The Bell company then threatened to cut off all communication between these farmers and the city unless the farmers should agree to allow the Bell company the use of a portion of their switchboard. Under these coercive measures, the farmers agreed and now feel that they must have been sleeping very soundly when they even thought of giving something they could call their own to the corporation, and they long for the return of the day when they were not hampered by the restrictions placed upon them under the new regime.

FORFEIT OF $25,000 RETURNED TO INDEPENDENT TELEPHONE COMPANY IN OMAHA.

AT a recent meeting of the city council of Omaha, Neb., the matter of the $25,000 cash deposit of the Independent telephone company was held under consideration to determine whether it should be released and returned to the company or not. The city engineer certified to the practical completion of the construction in a first class and satisfactory manner of the system which includes 19.12 miles of underground conduits containing 104.72 miles of cable ducts with 67.47 miles of overhead line construction. The engineer further reported that the construction of the plant is in full accordance with the requirements of the franchise granted to the company. After considering this report, the council unanimously voted that the forfeit be released and returned to the company.

THE INDEPENDENT OPERATORS' ASSOCIATION OF LINCOLN, NEB.

AN association of operators which seems to be based on exceedingly practical lines for the study of telephone work, and the improvement of service which its members are instrumental in giving, has just been organized at Lincoln, Neb. The operators of the Western Telephone Company, which owns some of the most important long distance lines in the state, have decided to get together every two weeks for the study of subjects with which they must deal in the course of their daily work. Meetings are held by the night operators at 1:30 in the afternoon, and the day operators meet at 7:30 in the evening of the same day. One of the features of the meeting is the giving of instructions according to a plan worked out by Mr. S. A. Hensley, superintendent of the Western Telephone Company, and explanations of important branches of the operators' work are given at each meeting, the same explanations that were given at the afternoon meeting being repeated at the evening meeting, so that both groups of operators may be taking in new information on the same subjects at the same time.

Instructions start with the switchboard equipment, and such things as the use of the keys, transmitter, receiver, cords, plugs, jacks and general equipment are gone into thoroughly. These instructions have been followed by an explanation which has as its object the familiarization of the operators with the lines themselves. The instructor takes each line and group of lines and explains to the operators what is meant by a terminal, resistance, grounds, crosses, escapes, loops, spur stations, etc.; also the manner in which a line enters the office, and the general nature of the equipment is explained. A question box is maintained, and after the regular instruction the operators receive answers to any questions they may ask, and discuss matters between themselves.

The minutes of the meetings show the thoroughly business-like character of the proceedings. The operators have elected a president and secretary, and the discussions are carried in an orderly fashion. The minutes of the meeting show the character of the discussions, and also state the questions asked. Their practical nature will be evident from the following quotations of questions asked in a meeting:

"Is it not better to let a call go through without an O. K. when you are pretty sure it is all right than to lose the call and make people angry?"

"Do you think that all operators should have a head telephone and transmitter of their own?"

"Why can't we hear Palmyra as well on line 19 as on 16?"

"Is the circuit equally strong in the automatic and toll plugs? Why can't you call automatically with a toll plug?"

"Is it an uneven electric circuit that makes a line 'cut out'?"

"When is a line grounded and how do you clear it?"

"How much time should be given to 10, 15 and 20c. messengers to report?"

"Is there any way of telling when an out or in connection is through without cutting in on them?"

"Why is it that as soon as an operator gets to be first class on the farm board she is taken off and put on toll?"

"Isn't an operator ever justified in answering an angry subscriber sharply?"

The operators are very enthusiastic over the work, and seem to find that these meetings help them to handle their positions at the switchboard in better shape. Invitations have been given to different telephone men visiting in Lincoln, as well as to the officers and members of the telephone company of Lincoln, to meet with the operators. Mr. R. E. Mattison, secretary of the Nebraska Independent Association, gave a short talk at the meeting on November 21, and it is expected that other prominent telephone men in the state will take an active interest in forwarding this movement which promises to be so useful to the company and its subscribers.

ANOTHER INDEPENDENT FRANCHISE IN THE VICINITY OF CINCINNATI.

THE Fitzsimmons Telephone Company is making rapid advances toward the long sought goal of an Independent franchise in the city of Cincinnati. It is said that on December 18 the village council of Mt. Healthy granted the company a twenty-five-year franchise, in spite of the determined opposition of the Bell company. The Fitzsimmons company is becoming very strongly entrenched in the neighborhood of Cincinnati, although it has not yet been able to overcome the opposition in the larger city. It has secured franchises in Oakley, North Bend and other villages in Hamilton county, Ohio, and has also secured a concession permitting its entrance into Covington, Ky.

The leading business men of Cincinnati are more than ever favorably disposed toward the entrance of an Independent company, and the time is fast approaching when their continued demands will force the city officials to grant a franchise on equitable terms.

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Views Afield

THE INSTRUMENT INSTALLER'S PLACE IN A TELEPHONE ORGANIZATION.

PERHAPS it is because a man who goes to work on the equipment of an operating telephone company usually is an installer's helper at the very start that so few of the men in the business are willing to admit that they really understood their jobs when they were doing this kind of work. One can find plenty of men who have been good instrument setters, done their work honestly, quickly and well day after day. But when it comes to the question of why they did good work rather than bad, the only reason the average man can give is that he had it in him to do things in the right way, and not that he did them well with any particular object in view, except possibly that of securing a raise in wages. Now this is very well, and a proper attitude for the exceptional man—the fellow we read about as the man who is bound to rise. But the man who is going along in a sort of haphazard way, not thinking very much about the company, and not really caring whether he makes a good ground or a bad one, if it is in a place that is a little dark so that it will pass a casual inspection, needs a lift. He needs to boost his own game by doing some good solid thinking when he smokes his pipe in the evening, and trying to figure out just where he stands.

Every man wants to get ahead. He feels good when people recognize that he has come to be a better man than the next fellow, who started even with or ahead of him. He sees people farther up the line who are getting, by their own ability, the things he wants—more money to buy things worth having, more latitude in the choice of work to do and how to do it, the greater respect from fellow workers which is accorded the man who knows things. There is nothing in the world that offers a stronger motive for action to a young man than this. The success of the correspondence schools has proved the truth of it, not so much by the fact that they get men to study, as for the reason they have found that the advertisements which are the most certain to bring in new enrollments are those appealing to this trait of character.

The man who is putting in telephones, however, is not at first very sure of how to go about the work of pushing himself along. In fact, although he is a member of a big organization, and hears that there is lots of room at the top of it, he cannot see just how the lines of advancement run. The first thing he wants to do is to find out where he stands now, so that when he does take a step it will be forward and not sidewise. How many installers realize that advancement comes to men in their position not primarily because they do good work of one kind, so that their faithfulness deserves recognition and reward, but rather because they have shown that they are so capable of contributing to the success of the company that it is unprofitable to keep them at the lowest grade of work they can do. Still, the manager who is nearly always too busy to keep an eye on all the little personal things that go to show a man's character has this object in mind every time he gives a man a chance to step along. His sole reason is, or should be, that making the promotion will help the company to give better service for the same money or less, and increase by some amount its strength as a business organization.

Now the question for the installer is "Just what is the way in which the boss looks at the details of my work?" Let him get the boss out to look at a bad job, and find faults in it. If the installer could only get him to tell just what these faults mean, not to the installer, but to the company, it would be a very helpful thing. Take for example, just to show the bigness of little things, an instrument fastened to the wall at the ordinary height when everybody in the house is exceptionally tall. This is a little thing enough, one will say, and if the manager ever notices it he will probably make no mention of it to the installer. The manager knows, as does the installer also, well enough, that the people who use the instrument will keep their lips too far from the transmitter when they speak, rather than stoop to its level.

The place where the manager goes beyond the installer is in the related things which come into his mind. The sight of that instrument is very likely to make him think that the subscribers when they use this telephone will be poorly heard, and have to speak with undue loudness. Every time this particular instrument is in use the people at both ends of the wire will know that transmission is not as good as it was from some other telephone they have used, and will blame the company for poor service. Possible annoyance of the manager by complaints, slow collections perhaps, gossip which hinders the solicitors in their work of getting new subscribers, narrow-minded suggestions to city officials when privileges are required by the company, all suggest themselves as things which have in the past resulted from no greater errors than this. So it goes with other things all along the line of workmanship up to the worst faults of all, those liable to affect the proper working of protective apparatus. There is no reason why an installer should not have something in his mind when he puts up a protector besides getting it fastened so that it will look straight on the wall. A protector is not an ornament—it is put on a telephone line to keep out electric currents which are liable to cause fires or injury to persons by electric shocks. Things about its installation which will impair its efficiency for this purpose can only be guarded against by an installer who bears them in mind every time he is fastening one of these pieces of apparatus to the wall, and connecting his wires to it. The man who does this will win favor surely enough over the fellows whose poor work is followed by a damage suit.

FARMERS' LINES AND TELEPHONE DEVELOPMENT.

FARMERS who have wasted a lot of money reconstructing lines and keeping them in repair, will say quickly enough that all their troubles have come upon them because they had no appreciation of the meaning of the phrase telephone development that the bigger companies talk so much about. Go to the average farmer who has put in a telephone line to his son's house and finds that two of his neighbors farther down the road want connections, and ask him what he expects could be done in the way of developing his line into a system. It is ten to one he will start in and enumerate the possibilities more accurately than the best telephone man from a large company could do, provided the telephone man was a stranger in the place.

If this is true, one of the first questions a man not familiar with the conditions asks is "Why is it then that farmers have so often let themselves into a scheme for wasting as much money as they have done by failing to build for this development they could foresee, if they really are able to count up possible subscribers?" For the answer one has to go back to the farmers again, get all their replies to the question and average them up. In the first place, when the builder of the first short line puts up his poles he does not figure on going into the telephone business. One bracket is enough to carry his wires. He is so busy with his farm that if he figures on the people he could connect he just counts them off one by one for amusement, and never takes the total. He does not bother to add them up, because the sum would not interest him. So he really has no reason before he sets his poles for finding out whether they will carry six wires or thirty, and puts up sticks of the beanpole variety because they are the cheapest. The same thing applies to his instruments. Ask the man who likes to talk with his son down the road a piece, who is the most distant person he would ever talk with if he had a wire right to the spot, and in his answer he will mention a good substantial distance, and probably surprise you. But the farmer in putting in his first telephone never thinks of providing for this by getting a first class transmitter, any more than he thinks of getting a generator that will ring on a line carrying sixteen instruments and plenty of tree grounds.

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From a Legal Viewpoint

CONDUCTED BY A. H. McMILLAN.

CROSSING OF RAILROAD TRACK BY TELEPHONE LINE.

We have a legal proposition confronting us which I would like very much to have answered. Our lines cross a railroad company's track at a certain point on the public highway, or country road. The company has been at us for the past five years to give them a written contract for the same, which we considered was too strongly written for our good, and we have refused or put them off until the present time. They now say if we do not sign the contract they will proceed to remove the wires from above their crossing. Will you kindly state whether they can do the same, when the crossing is on the public highway. The crossing is in New York State. We will consider it a favor for an early reply. The poles stand on the public road each side of the crossing and not on the railroad line.

F. U. TEL. CO.

THE railroad company would not be able to force you to move your lines when they cross the railroad tracks on the public highway. The laws of the State of New York provide that a railroad company may build over public roads, etc., subject to the rights of owners to full compensation. Laws of 1890, page 1151, Sec. 102. This gives you such a right in the highway that you could not be forced to move at the instance of any other company having an analogous right in the public road. The right that the railroad company has in the road is given it by statute, so it is the editor's opinion that your privilege in the road at the point of crossing is quite equal to that of the railroad company, and when the railroad company crosses a highway, it subjects its road at that point to the right of telephone and telegraph companies to use the highway as authorized by law.

SUFFICIENCY OF FOREMAN'S ORDER.

A FOREMAN of the Cumberland Telephone and Telegraph Company by the name of Schmuck, with a crew of hands, went to push back into a perpendicular position a pole on the line of the company which had leaned over from a heavy sleet. The telephone wires were near the top of the pole, and about one-third of the way down ran an electric light wire carrying a heavy voltage of electricity. When the men had dug the earth out around the foot of the pole, and tried to push it back to a vertical position, it was found that the electric light wire held it. It began to rain and the wet pole came in contact with the wet wire, and the foreman said: "We will have to put an insulator on that pole to get that electric light wire away." No one was near the wire but Graves, and the foreman saw that the latter understood the words as directed to him. In doing the work the lineman, Graves, was killed. Suit was brought by the deceased man's administratrix to recover damages from the company, and a verdict of ten thousand dollars was given. The telephone company appealed, but the Court of Appeals of Kentucky affirmed the judgment. The court held that the foreman's acquiesence in the lineman's action in obeying the order was equivalent to a prior command. It was also decided that the employee had a right to assume that the foreman would not direct him to do anything which would endanger his life, unless he knew the contrary. Cumberland Tel. & Telg. Co., vs. Graves' Adm'x., 104 S. W. 356.

RIGHT TO USE STREETS IN MINNESOTA CITIES.

AN important and interesting case was that of the Northwestern Telephone Exchange Company against city of St. Charles, Minn. The question was whether the company had the right without the consent of the city authorities to establish a telephone exchange in that city, which, while it would give local telephone service to the citizens who might choose to patronize it and become subscribers, would also, undoubtedly, aid the company's long distance service, for which, it had already a line established in the city, extending from Winona, by the way of Rochester, to Mankato, and thence into other states. The company was organized under an act (Gen. St. Minn. C. 34, Tit. 1, Sec. 42) which gave telegraph and telephone companies the right to erect poles for their wires in any road or highway in the state. This act was amended (Act Minn. Apr. 19, 1893) by providing that such companies should not use streets or alleys in any city or village without first obtaining a franchise from such city or village according to the terms of its charter, and without first making just compensation therefor. The court held that the statute above amended merely granted a license which the legislature could revoke or modify at any time, except in so far as it had been previously acted upon by the actual erection of poles in streets and highways, and that under the statute as amended, a city or village might exclude any telephone company from using any street or alley not used by it, prior to the amendment, unless, authorized by an ordinance or resolution of its council.

The company made no attempt to use the streets of the city until 1896, when it was granted permission to erect poles and wires upon certain streets. A pay station on a company's long distance line was established at St. Charles and made use of until 1899 from which time until 1905 the company used the exchange of the People's Telephone Company in St. Charles, under contract with that company. In 1905, this contract was discontinued, and a request of the company to the council for permission to use streets and alleys was refused. The Court held that the company had no rights in any streets, except those named in the resolution of 1896. The fact that the company's line, when completed, would be used for the purposes of interstate commerce was held to have no effect upon the case. Northwestern Telephone Exchange Co. vs. City of St. Charles, 154 F. 386.

DEFECTIVELY INSULATED WIRES.

A JUDGMENT in the Supreme Court of Pennsylvania in favor of the Delaware and Atlantic Telegraph and Telephone Company at the suit of Hattie L. Combs has been reversed. The facts were that a telephone pole was charred at a point where an electric wire either did or could have come in contact with it. The pole leaned toward the electric wire and away from its proper position. The electric wire sagged in the direction of the telephone pole. About six weeks before the accident some one, realizing the danger, nailed a board over the charred place on the pole, and attached to it a glass insulator, to which the wire was fastened. An employee of the telephone company, not familiar with the situation, was sent from Wilmington to make repairs at Chester, where the pole was located. While descending the pole something happened, no one knew what, except that the man fell to the ground, and when found his face was black, and his shoe burst open, and he did not live long enough to tell the story. Immediately after the accident the electric wire on either side of the insulator was found uninsulated. The trial court directed a verdict for the company which was reversed by the Supreme Court. In its opinion the court said that the facts were sufficient to warrant a jury in finding that the death resulted by reason of the foot of the deceased man coming in contact with the uninsulated part of the electric light wire near the bracket. It was argued that because the dangerous and defective condition was not in the telephone wire, but in the electric wire, the negligence complained of was that of the electric light company and not of the telephone company. In commenting on this condition, the court said "It was no part of the duty of the telephone company to repair the lines and wires of the electric light company, nor, in this particular instance to properly insulate that portion of the wires uninsulated." The court held, however, that it was the telephone company's duty to keep its lines and poles free from contact with dangerous currents of electricity not properly protected, no matter who produced them. Combs vs. D. & A. Telg. and Tel. Co., 67 A., 751.

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The Query Page

WIRE CHIEF'S TESTING CIRCUIT.—(957.)

I desire to connect up a testing board for our wire chief to be used in connection with our common battery system and will be very grateful to you if you will advise and outline a circuit arrangement which will take care of this in a thorough and economical manner. That is, we desire the arrangement to be sufficiently flexible to allow of any of the ordinary tests being made without the introduction of other apparatus than that already contained in the original installation.

W. A. P., Ohio.

A CIRCUIT such as you desire and one that is frequently used in common battery exchanges is shown in Fig. 957. In this the wire chiefs' board is provided with jacks connected to plugs terminating on the multiple board which are inserted by operators in case of trouble appearing in the jacks of line in trouble and still other jacks are provided for testing trunks to the main distributing frame.

The plug shown in Fig. 957 is inserted in the jack of the cord connected to the line to be tested, and by the proper manipulation of the keys shown, any of the customary tests may be made.

Key No. 1 is a ringing key which allows the wire chief to ring out on the line, thus determining whether the subscriber can be "raised" or not.

Key No. 2 is the reversing key which reverses the entire testing equipment with respect to the tip and the ringing sides of the line being tested.

Keys Nos. 3 and 4 are for grounding the different sides of the line. Key No. 3 grounding the ring side and No. 4 the tip side.

Key No. 5 is the voltmeter key which when operated together with key No. 12, bridges the voltmeter onto the line for making the desired tests.

Key No. 6 is the relay key and is connected, as you will note, in such a manner as to operate the 60-ohm relay when there is a ground on the line, thus causing the ground signaling bell to be actuated. This is a test for ground on either side of the line, as the line may be reversed by the actuation of key No. 2 by the wire chief.

Key No. 7 is a continuous ringing key; that is, a key to which the leads of a continuous ringing generator are connected. This may be used in place of key No. 1 in signaling the instrument desired.

Key No. 8 is left spare in order to provide for any future contingencies.

Key No. 9 connects the cord circuit to the wire chief's talking set so that conversation may be had upon the line. The inner contacts of this key are connected to other listening keys where more than one wire chief's position is installed, and may be left unoccupied where but one position is used.

Key No. 10 bridges the retardation coil across the line so that when the wire chief is talking to some person through the board, by throwing the retardation coil key, the supervisory signal in front of the operator is extinguished, thus allowing the wire chief, by throwing the listening key No. 9, to carry on any conversation he may desire, and by returning key No. 10 to its normal position the supervisory signal will light, thus advising the operator that the use of the line is no longer required and that the connection may be taken down.

Key No. 11 is for the purpose of connecting battery cord circuits through repeating coil or retardation coil for any particular purpose that may be desired where the full force of the battery is not required.

Key No. 12 cuts off the battery from the voltmeter. Where quick readings are desired, this key may be operated rapidly.

Key No. 13 is for connecting the six volt battery to the low scale of the voltmeter.

Key No. 14 is for connecting the shunt across the low reading scale of the voltmeter in order that by comparison of this winding with the total resistance of the voltmeter circuit and the application of the voltmeter shunt principle of measuring an increased reading may be obtained on the voltmeter where the trouble is of such a nature that a sufficiently large deflection for easy reading would not be obtained where the force of the battery was flowing through the voltmeter, the line and the trouble, in series.

In this circuit a voltmeter has been employed for the purpose of making the measurements, as with this instrument the necessary tests can be performed more readily and with greater degree of exactness in a given time than by other means. Sometimes a Wheatstone Bridge is substituted, and so arranged that it may be conveniently and rapidly connected to or disconnected from any line on which the wire chief may be desirous of making a test.

Should you desire further information in relation to any particular test you may wish to make with this equipment, we shall be pleased to have you advise us exactly what you desire to accomplish and we will describe the test in detail.

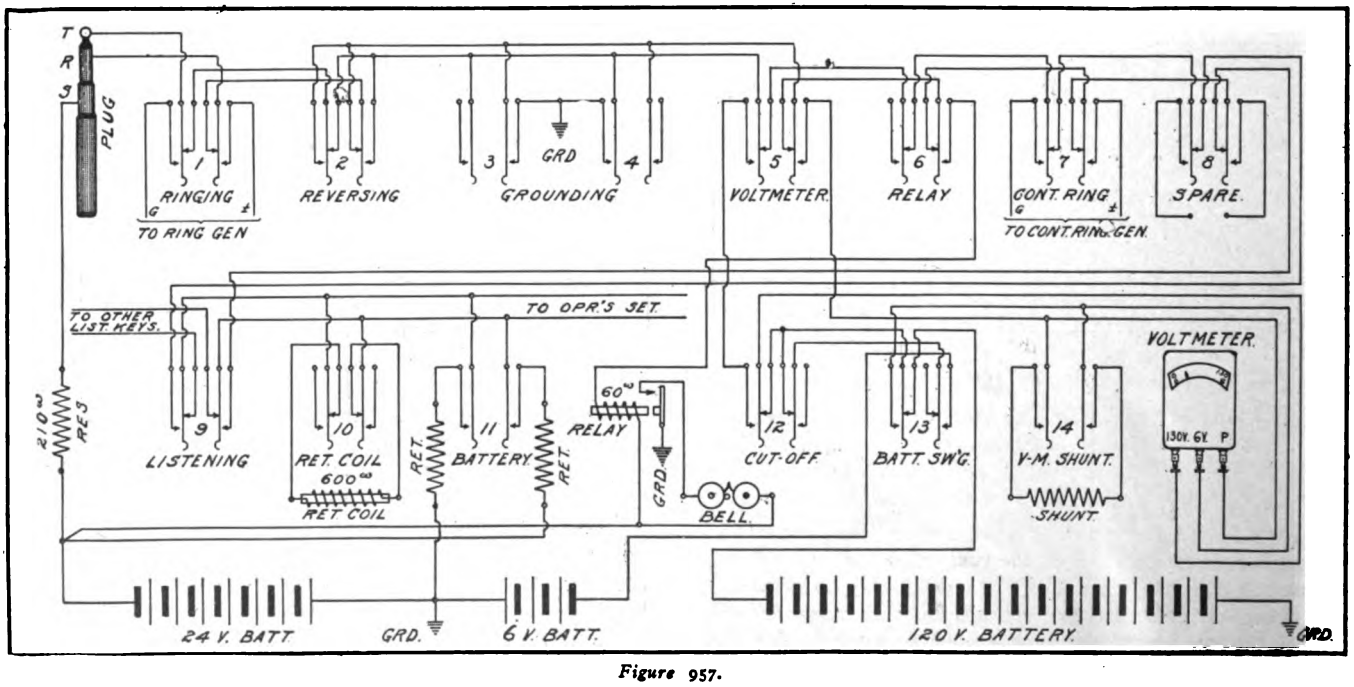

Figure 957.

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Patent Reviews

GROUND PLATE.

Budd J. Jones, Cincinnati, O., patent No. 873,375, December 10, 1907.

The object of this invention is to furnish a made-up ground plate unit ready to install, and dispense with the present practice which necessitates the securing of the several parts and assembling them at the time and place of installation. This feature of portability is especially advantageous in localities where material such as sheet copper, charcoal or coke are not obtainable, or secured with great difficulty.

The ground plate consists of a cylindrical can, in the vertical wall of which are placed at frequent intervals perforations of suitable size. Extending across the interior of this can, and bolted to its periphery on each side, is a perforated plate of metal carrying, on a diagonal line, bolts to which the leading-in wire may be connected. The whole is enclosed within a cover, after having been filled with some such material as charcoal or coke, and may be set in the ground where needed.

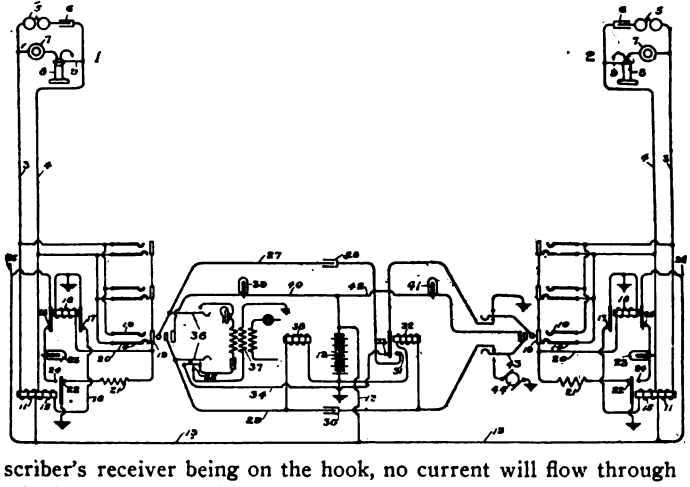
LINE AND CORD CIRCUIT.

Charles S. Winston, Chicago, Ill., patent No. 874,147, December 17, 1907, assigned to Kellogg Sw'b'd & Supply Co., Chicago, Ill.

This system, as is shown by the accompanying illustration, provides a three-wire, multiple line circuit, and cord circuit adapted to making connections between jacks. When a subscriber calls the line relay is operated by current flowing through windings 11-15. The operator on plugging in actuates the cut-off relay, the winding of which is of sufficiently high resistance to prevent the supervisory signal from lighting. All the current through this lamp now passes through the cut-off relay, as the low resistance shunt 21 is opened at contact 22. The cut-off relay opens the line lamp circuit at contact 25, extinguishing the signal. Impedance 38 is substituted in the sleeve side of the line in place of coil 13 of the line relay, thus maintaining the balanced condition of the circuit when the cut-off relay is operated. Coil 11 suffices to keep the line relay actuated while the subscriber's telephone is off the hook.

When the operator tests for a busy line she will, if the line is in use, get a difference of potential between the tip of her plug and the sleeve of the jack, producing a flow of current over the tip strand to conductor 34, to her telephone set.

Upon completing the connection, owing to the called sub-



scriber's receiver being on the hook, no current will flow through winding 11 of the line relay, and supervisory lamp 41 will be illuminated over a path through the comparatively low resistance 21, in parallel with the winding of the cut-off relay, to ground.

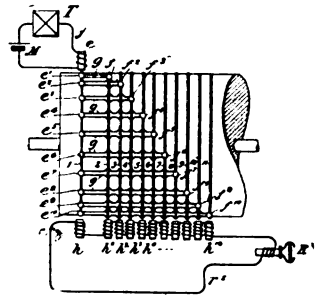
When the called subscriber responds this line relay operates, removing the low resistance shunt around the cut-off relay, thus putting out the supervisory signal. Relay 32 is also operated, disconnecting the conductor 34, and completing the talking circuit between the tips of plugs. When in communication the impedance of windings 11 of line relays and coils 32 and 38 prevent the shunting of voice currents, which pass inductively through condensers 28 and 30.

When the subscribers hang up their receivers the circuits through windings 11 of line relays are opened, and armatures drop back, thus inserting low resistances 21 in parallel with the winding of the cut-off relay to reduce the resistance of the supervisory circuit, causing the supervisory lamp to be lighted.

METHOD OF RECEIVING AND STRENGTHENING THE REPRODUCTION OF SPEECH.

Emil Schack Hagemann, Copenhagen, Denmark, patent No. 873,541, December 10, 1907.

The apparatus described in this patent covers substantially



a form of telephone relay based upon the principle of the localization of magnetism originally set forth in patents on the telegraphone by V. Poulsen. Upon a cylinder or drum, as shown in the accompanying illustration, are applied a number of steel rings or bands, 1, 2, 3, 4, etc. Supported outside of the cylinder, so that their poles will be in close proximity to or in contact with the rings 1, 2, 3 are electromagnets e^1 e^2 e^3, etc. Similar electromagnets f^1 f^2 f^3 are placed in the line of elements of the rotatable cylinder corresponding to the magnets e^1 e^2 e^3, etc. The windings of the electromagnets are connected in parallel in pairs consisting of magnets e^1 f^1, e^2 f^2, etc.

In operating the device, as the cylinder rotates, variations in the strength of the controlling magnet *e* are produced by changes in the resistance of the receiving circuit, including battery *M* and the resistance varying medium, consisting of the transmitter *T* or telephone line. It will be seen that the steel band 1 has imparted to it an amount of magnetism which varies under the influence of *e*, and as these variations pass the magnets e^1 e^2 e^3 current is induced in the windings, which varies the magnetism of electromagnets f^1 f^2 f^3, which in turn affect the corresponding steel bands in a manner similar to the effect produced upon band No. 1 by the magnet *e*. Along a certain element of the cylinder magnets *h* h^1 h^2, etc., are set with their poles in proximity to the bands, and the windings of these electromagnets are all connected in series with one another and with a telephone receiver. The effect of the device in operation is to cause magnetic variations to be stored up in accordance with the principle of electric currents in a multiple circuit, while electromotive forces in the outgoing circuit combine in series to produce a higher electromotive force than that existing in the circuit through magnet *e*. Strong permanent magnets set beyond the reproducing magnets wipe out the record, leaving the steel bands free to be continually acted upon by receiving magnets.

TRANSMITTER.

Carl J. Printz, Milwaukee, Wis., patent No. 874,118, December 17, 1907, telephone transmitter.

This patent covers an arrangement of a transmitter mouthpiece for furnishing a steady supply of disinfecting material. About the base of the mouthpiece is clasped an annular tube, having an opening by means of which it may be filled with a liquid or dry disinfecting substance. This is supposed to gradually generate a gas or vapor, which passes within the transmitter mouthpiece through perforations provided in its circumference.

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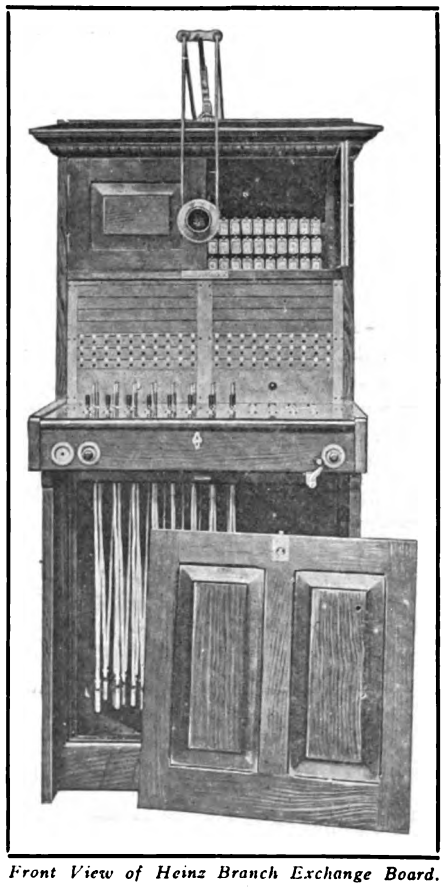
Manufacturing Developments

BRANCH EXCHANGE SWITCHBOARD USED BY THE H. J. HEINZ COMPANY.

A BRANCH exchange switchboard combining a number of new features in a standard framework has recently been sold by the Stromberg-Carlson Telephone Mfg. Company, of Rochester, N. Y., to the H. J. Heinz Company, of Pittsburg. This is installed in the company's office at Allegheny, Pa. The equipment is of the type furnished by the Stromberg-Carlson Company to operate in connection with a common battery central office.

The cabinet is made in accordance with the company's drawings for a standard A-4583 framework. Woodwork is of mahogany, with a polished dark mahogany finish. The key shelf is of five ply construction, and is set low in the framework, being only 31 inches from the floor, thus making it possible for the operator to sit in an ordinary chair while at work. A heavy belt leather strip covers the plug shelf, and furnishes protection against marring from the plugs when they drop back into place. Protection for all of the apparatus is furnished by panels, the front panel being set in the frame to make the construction especially solid. Between the cords and the wiring is a removable panel, which when taken out gives access to the wiring of the relays and the rear of the terminal board. As will be seen from the accompanying illustration, the equipment for the initial installation is furnished to provide for 60 lines and 8 pairs of cords, with double lamp supervisory signals.

The board is arranged to take care of an ultimate 120 lines with lamp line signals, and 12 pairs of cords. Ten plug ended trunks can also be furnished if the purchaser so desires. The manufacturers believe that in the arrangement of the equipment they have an especially noteworthy feature in the location of the line relays. These are placed in the top of the cabinet, where inspection may be readily effected from the rear by removing the back panel, while a door in front allows the trouble-man to get at the relays from the operator's side of the board. The cord relays are mounted in the rear of the cabinet behind the cords, being also accessible from both front and back. Terminals for all the lines are located on a board below the cord relays. A shelf below the terminal boards serves a double purpose, in providing a mounting for the condensers and covering a space below which is left open for a cable run, in case the customer should later on desire an additional section to be set up adjacent to the present one. In the rail below the key shelf are mounted the operator's cut-in jacks, the night bell key and generator switching key. All apparatus conforms to latest Stromberg-Carlson practice.



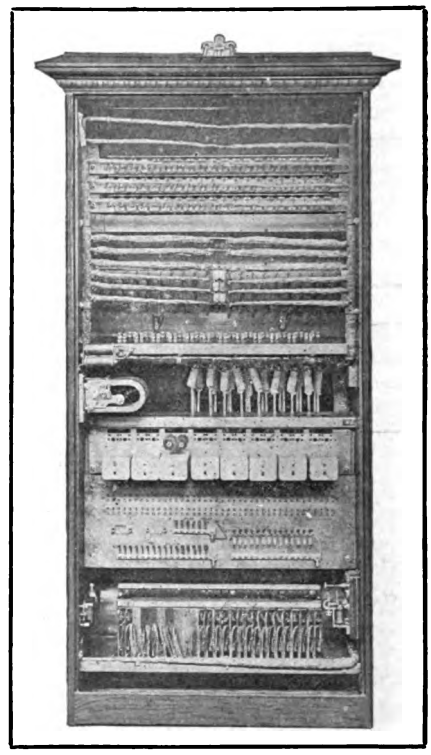
Front View of Heinz Branch Exchange Board.

A DIRECT CURRENT COMMON BATTERY TELEPHONE.

A Study of Circuits for Common Battery Sub-station Sets.

By C. D. ENOCHS.

THE original telephones, as designed by Mr. Bell and used on the first lines which were constructed for the transmission of speech can hardly be classed as either local battery or common battery instruments. The talking current was generated by an instrument which was in principle the same as the ordinary receiver of to-day. The movement of the diaphragm under the influence of the voice vibrations generated a current by varying the number of magnetic lines passing through the diaphragm and the coils of the transmitting device. This current was necessarily alternating in character. The local battery telephone, which was developed as soon as the variable contact transmitter was invented generated the voice crurents by the fluctuation of current through the primary of the induction coil and the transmitter, and this sent an alternating current from the secondary of the induction coil to the line.



Rear View of Switchboard Equipped for H. J. Heinz Co.

The introduction of the common battery, or central energy switchboard a number of years later brought with it a new problem in the matter of designing circuits and apparatus to be used in the telephones operating with this new type of switchboard. It will be noted, however, that in the circuits discussed later that up to the production of the new direct current common battery telephone, all of these telephones used transmitting circuits that generated, either wholly or in part, an alternating current. There is but one exception to this and that is the circuit designated as circuit No. 1, which was discarded almost universally on account of its low receiving properties. The distinction between a transmitting device which sends out pulsating, or direct current and one that sends out alternating current should be borne in mind while reading the discussion of the development of circuits.

It was recognized by all progressive telephone engineers that the common battery switchboard would play a very important part in the development of the art of telephony. While they admitted that the ease of signaling and the surety of signaling, together with the compactness of the new type of board, made it indispensable in the larger exchanges, many of the engineers held, with some justice, that the telephone should furnish its own battery for the talking currents. This led to what was at that time a popular system and one that was for some time a formidable rival of the straight common battery switchboard, namely a common battery signaling system with local battery talking.

However, as common battery systems were brought into more general use, it was found that although a local battery telephone at a distance of several miles from the exchange would

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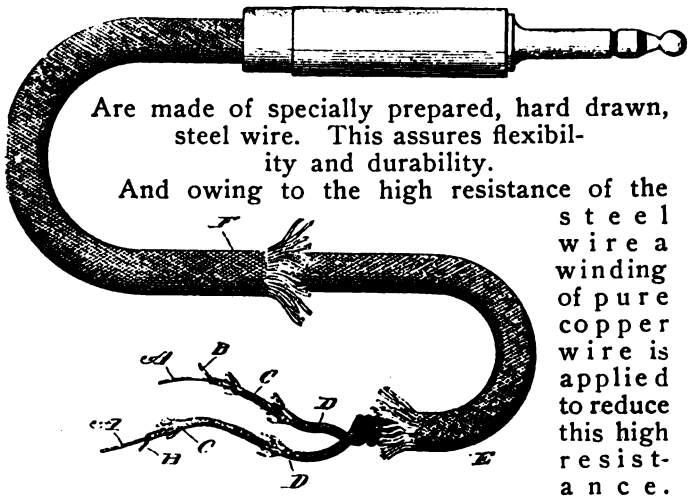

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Manufacturing Developments

talk better than a common battery telephone at the same distance from the exchange, yet as a matter of fact the average

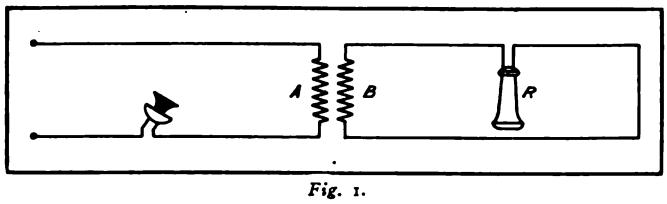

Fig. 1.

telephone in a common battery exchange talked better than the average telephone in a local battery exchange.

In the first place the common battery telephone that was not too far from the central exchange talked practically as well as the local battery telephone. In the second place, although the local battery telephone had theoretical advantages when located at a distance from the exchange, this advantage was more than offset by the fact that dry cells eventually lost their efficiency, so that a local battery telephone which might talk better than a common battery instrument for the first two months that the batteries were in service would not talk as well as the common battery telephone for the next six or eight months that the batteries were in service. In short, the working or "commercial efficiency" of the common battery telephones was found to be greater than of the local battery telephones.

Probably the oldest circuit in use is the one shown in Fig. 1. In this the transmitter battery flows through the winding *A* of the induction coil to furnish the talking power. The talking qualities of the circuit depend entirely upon the change of resistance of the total subscriber's loop by the variation of the transmitter resistance. Although the impedence of the winding

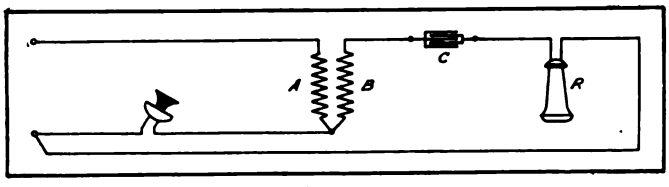

Fig. 2.

A of the induction coil is considerably reduced by the short circuiting of the secondary *B* through the receiver *R*, yet the talking qualities of this circuit are rather poor, and it has not been used extensively in late years. The receiving qualities of the circuit depend entirely upon the transformer action of the coil and, as the induction coil is a very inefficient transformer, the receiving qualities of this circuit are decidedly below par.

The second circuit in point of age, and one which is used almost exclusively by the Bell companies at the present time is what is known as the "Hayes condenser circuit," and is shown in Fig. 2. This circuit is a great improvement on that shown in Fig. 1, in that the condenser acts as a source of stored up energy to take up or give out current upon the variation of the transmitter resistance.

If the resistance of the transmitter is lowered the potential across the condenser is higher than across the transmitter, and the condenser discharges through the receiver, transmitter and winding *B* of the induction coil. This discharged current is transformed by the induction coil and sent out over the line. If the two windings of the induction coil are properly connected

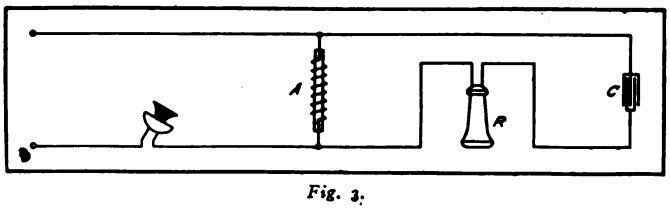

Fig. 3.

this impulse of current sent out builds up the impulse of current due to the change in the total loop resistance by the lowering of the resistance of the transmitter. This circuit has proven to be extremely well designed as far as talking qualities are

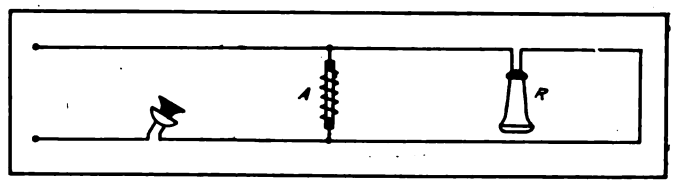

Fig. 4.

concerned. However, in receiving qualities the circuit is poor. The action is the same as in circuit No. 1, being entirely dependent upon the transformer action of the induction coil. As a condenser is in series with the transformed circuit, there is a slight loss in receiving qualities in this circuit as compared to circuit No. 1.

The next circuit to be taken up is what is known as the impedance coil circuit. This has been used in several forms which will be taken up in turn. The first or oldest form is shown in Fig. 3. In this an impedance coil is placed in series with the transmitter and the line. The receiver in series with a condenser is bridged across the impedance coil. The talking qualities depend mainly upon the variation of the total loop resistance by the transmitter, but there are some slight advantages gained by the action of the condenser *C*, so that this circuit talks slightly better than the one shown in Fig. 1, but not nearly as well as the one shown in Fig. 2.

As a receiving circuit this circuit has many advantages and also several disadvantages. The theory is that the voice currents will be shunted into the receiver on account of the high inductance of the impedance coil. However, the actual working results are that a considerable portion of the voice currents pass through the impedance coil and are entirely lost. In spite of this disadvantage, however, the circuit receives better than either circuit No. 1 or No. 2.

The first variation of this circuit was in the leaving out of the condenser, leaving the circuit as shown in Fig. 4. The resistance of the impedance coil had usually been 20 to 25 ohms. This resistance would cause a drop of several volts across the receiver, and it was found that this was sufficient to either depolarize the receiver magnets, in case the current was flowing in one direction, or have a tendency to buckle the diaphragm in case the current was flowing in the other direction.

The discovery was made that it was possible to build an impedance coil of only a few ohms resistance that would have practically the same impedance as the 25 ohm coil. This, of course, would decrease the potential across the receiver, and, threfore decrease the tendency to demagnetize the receiver or buckle the diaphragm, as the case might be. This circuit, however, has never been popular, as it is not considered good practice to allow any tendency to demagnetize receivers in actual practice.

The second variation of the impedance coil circuit is what is known as the bridge circuit. This is shown in Fig. 5. In order to keep the current out of the receiver, advantage is taken of the Wheatstone bridge principle. The proportion of the ohmic resistance of the coils A, B, C and E is such that there is no difference of potential on the terminals of the receiver, hence, there is no current tending to either demagnetize or buckle the diaphragm. Voice currents, however, are shunted by the im-

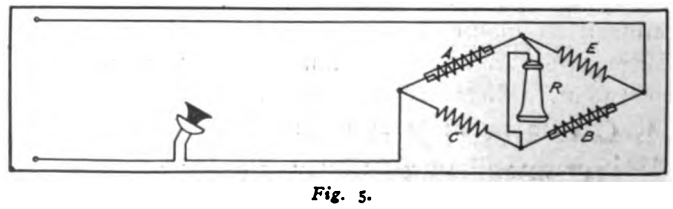

Fig. 5.

pedance coils A and B through the non-inductive coils C and E and through the receiver.

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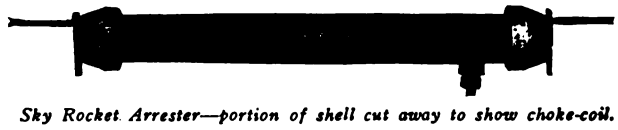

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Manufacturing Developments

The writer is of the opinion that the talking properties of this circuit are not quite so good as the original impedance coil circuit, as the slight benefit gained from the condenser in that circuit is not present in the bridge circuit. The receiving qual-

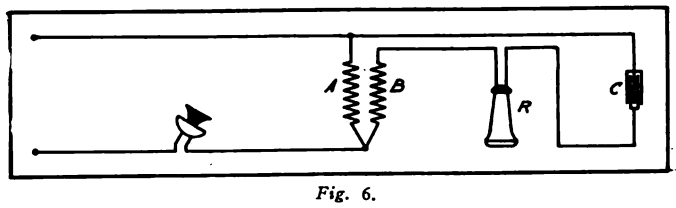

Fig. 6.

ities are probably a little better in this circuit, as the resistance of the non-inductive coils C and E to talking currents are said to be less than the resistance of the condenser. This is especially true if anything less than a two micro-farad condenser is used in the impedance coil circuit.

A later circuit, and one which has been used by two or three Independent manufacturing companies with very good results, is shown in Fig. 6. This is in principle a combination of circuits shown in Figs. 2 and 3. Transmitter battery is fed through the winding *A* of the induction coil. However, the talking qualities do not depend entirely upon the variation of the resistance of the transmitter *D*, but there is a condenser effect through the winding *B* of the induction coil operating somewhat like that in circuit No. 2. The talking qualities of this circuit are about equal to that of the Hayes circuit shown in Fig. 2.

There has been a circuit designed and put upon the market recently that has attained the purpose of preventing the receiver from being demagnetized in an entirely new manner, and in a way that is intended to eliminate all losses of talking current. Attention is here called to the fact that this circuit is the first circuit to be designed for the purpose of utilizing direct or pulsating current for transmission, as well as preventing the receiver from being demagnetized in an entirely novel manner.

It is interesting to look back, in view of the development of this latter circuit, and notice that for years the engineers have all attempted to accomplish the end of preventing the receiver from being demagnetized by means outside of the receiver itself. This new circuit is based on the use of a receiver so designed that it will not be demagnetized by direct current, although exposed directly to this current.

The new circuit, which is shown in Figs. 7 and 8, is new only in the design of the receiver itself. The circuit consists of noth-

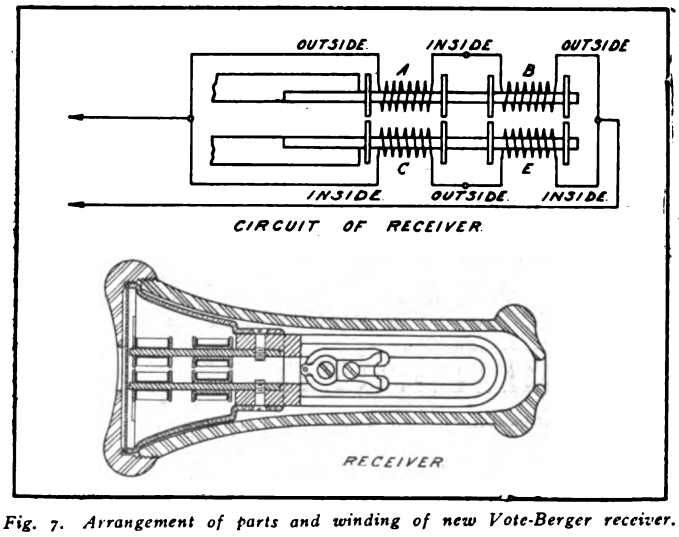

Fig. 7. Arrangement of parts and winding of new Vote-Berger receiver.

ing but a transmitter and receiver in series, and the novel features lie in the design of the receiver.

It will be noted that in place of the ordinary pair of receiver coils employed, there are four coils on the receiver. The coils *A* and *B* are in series, as are also the coils *C* and *E*, and the two groups are in parallel. The coils *B* and *E* are actuating coils, while the coils *A* and *C* are designed to prevent the demagnetization of the receiver or the buckling of the receiver diaphragm. Coils *B* and *E* are wound in the ordinary manner

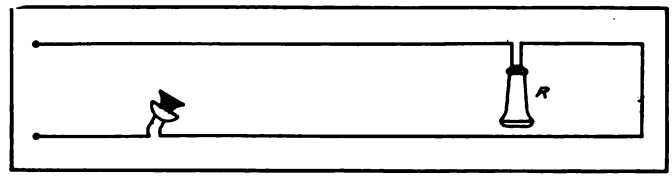

Fig. 8. Simple wiring of telephone circuit employing new Vote-Berger receiver—neither induction coil nor condenser is required.

and act upon the receiver diaphragm in the same manner as in the ordinary receivers. The coils *A* and *C* are wound in opposition to the coils *B* and *E* respectively, and their action is to oppose magnetism set up by the direct current in the coils *B* and *E*.

The magnetism produced by the transmitter battery flowing through the coil *B* is neutralized by that produced by this same current in coil *A*. The same is true in coils *C* and *E*, and it is evident that as the coils *A* and *B* and *C* and *E* respectively are in series, the effect of this transmitter current will be neutralized, no matter what the length of the line may be. The two groups are placed in parallel merely to reduce the ohmic resistance of the entire receiver, so that the transmitter will get its full current.

It is evident that if the coils *A* and *C* were made in the same manner as coils *B* and *E*, they would oppose not only the magnetism produced in coils *B* and *E* by direct current, but also that produced by the talking currents, and would thus reduce greatly the efficiency of the receiver. To obviate this, the coils *A* and *C* have a copper sheath over the core and copper heads on the spool. In actual practice the head and sheath are in one piece of copper. The effect of a copper sheath around a core is well known. It kills the action of the coil, due to any alternating currents of high frequency. It also reduces the impedance of these coils to alternating current.

It is evident then that with a receiver of this design we have a perfectly balanced receiver as far as direct current is concerned, and that in respect to the voice currents we have a receiver in which the action of the primary coils *B* and *E* is the same as an ordinary receiver, and the action of coils *A* and *C* is absolutely killed, not only as regards magnetic action, but also in regard to impedance. We have then in this circuit actuating coils *B* and *E* in series with non-inductive resistance *A* and *C*, and these resistances *A* and *C* are in parallel. As this resistance is low and is non-inductive, there is no effect from this resistance on the talking current.

Such a circuit gives full battery to the transmitter and allows full variation of the total loop resistance by the variation in the resistance of the transmitter *D*. This variation is greater than in any of the other circuits discussed, on account of the low impedance of the receiver as compared with either the induction coil or the impedance coil, hence the talking qualities of this circuit make an especially favorable showing. In receiving qualities the advantage gained is even greater. All of the voice currents received at the sub-station pass directly through the receiver without any loss through induction coil or impedance coil, and without any retarding effect of impedance coils or condensers.

It is believed that the design of this receiver or circuit, whichever way it may be classed, is an important step in common battery practice. It is unquestionably the first radical change in the receiver in ten or fifteen years and, combining as it does increased efficiency in transmission and in receiving with greater simplicity of circuits, its manufacturers, the Vote-Berger Co., of La Crosse, Wis., believe it will exert a considerable influence on common battery apparatus of the future.

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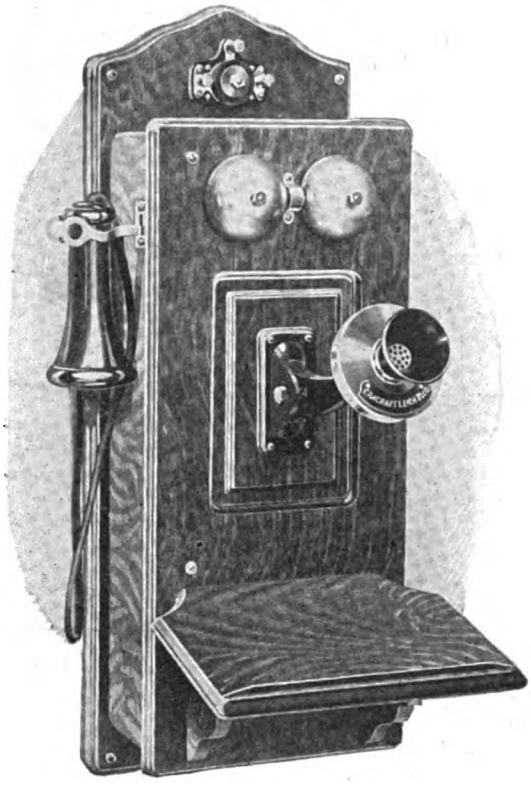

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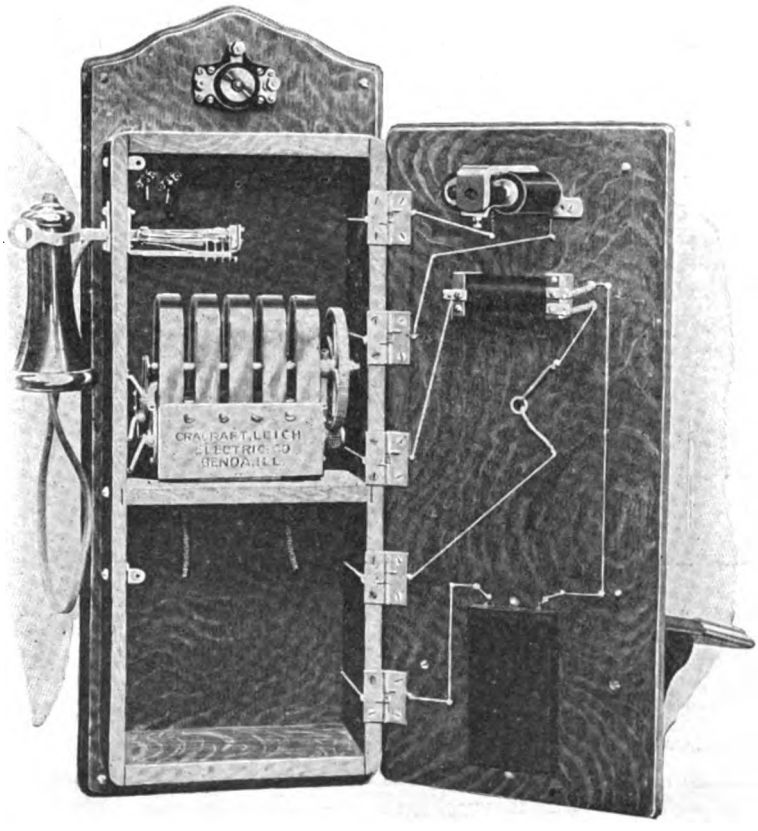

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Timely News

NEW COMPANIES.

WILLOW, CAL.—Among the newly organized Independent telephone companies is the Glenn County Telephone Company. It has already secured contracts for a considerable number of telephones, and it is expected that work on its system in Willow and into the surrounding country will be commenced at once.

PUEBLO, COLO.—The Independence Town & Improvement Company, whose purpose it is, among other things, to construct telephone lines, has filed articles of incorporation. It has an authorized capital stock of $40,000, and the following directors have been elected: Charles T. Fertig, H. Pollard, W. J. Whitlock, P. L. Packard, P. H. Burton, J. Tour and S. L. Roland.

NEW ATHENS, ILL.—Among the newly organized Independent telephone companies is the Point Lookout Telephone Company, of New Athens. It has a capital stock of $350, and those interested in its formation are William Zoeller, A. Sturm and L. Frantz.

JACKSON, KY.—The Jackson-Leatherwood Telephone Company, whose intention it is to construct telephone lines from Jackson to Leatherwood Creek, a distance of about forty miles, has been organized by J. M. Crawford, of Jackson, who is to be manager of the new company, E. B. Smith and others. The capital stock is placed at $4,000.

LINE FORK, KY.—An Independent telephone company, to be known as the Line Fork Telephone Company, has recently been organized by D. F. Fields and others. It starts business with a capital stock of $2,000, fully paid in, and contemplates the erection of a system extending from Line Fork to Whitesburg, a distance of about twenty miles. The new company is to be managed by Mr. Fields.

WHITESBURG, KY.—The Whitesburg-Pikeville Telephone Company, which expects to construct an Independent telephone line from Whitesburg, via Shelby and Robinson Creek, to Pikeville, about fifty-three miles, has been organized, and work on its plant is to be commenced at once. Its capital stock is placed at $3,000.

EAST JORDAN, MICH.—Articles of incorporation have been filed by the East Jordan Telephone Company, which is capitalized at $300,000.

PAVILION, N. Y.—Owing to the dissatisfaction caused by the recent raise in rates by the Bell company at this city, plans are being discussed by the citizens looking toward the formation of an Independent company. At a recent meeting A. J. Bernel was chosen as chairman, and S. O. Hubbard secretary, and the following committee appointed to solicit the purchase of stock and take charge of the other details connected with the new enterprise: Horace Bradley, Earl Starr, Bert Plucker, S. C. Wells, Charles Kingdon, M. A. Christman, John H. Quinlan, J. E. Sprague, W. L. Bradley and David Marrow.

SPRINGWATER, N. Y.—Articles of incorporation have been filed by the Canadice Telephone Company, of Springwater, N. Y. It has an authorized capital stock of $7,200, and the incorporators are L. M. Doolittle, M. J. Becker, E. E. Coykendall, Canadice, N. Y., and others.

FLORENCE, OKLA.—The Kent Rural Telephone Company, of Florence, has been incorporated with a capital stock of $840, and the following directors elected: J. King and A. V. Ray, of Florence; Ira Wisel, George W. Sneeds and J. Sanfyker, of Byron; J. H. Wilson and J. B. Jesseys.

POTEAU, OKLA.—An Independent telephone company is being organized at this city, whose purpose it is to install a thoroughly modern plant. Among those actively interested in its formation is J. W. Hale.

DIXON SPRING, TENN.—The Dixon Creek Telephone Company, which has a capital stock of $700, has been organized, and expects to be ready for business at a very early date. An up-to-date plant is to be installed at Dixon Spring, and connections established with the Hartsville Home Telephone Company, and with Pleasant Shade.

POUND, VA.—The Lower Pound Telephone Company is the name of the most recently organized Independent telephone company at this city. It has a capital stock of $2,000 and its plans include the building of a line from Pound to Wise, Va., a distance of about twenty miles. Among the organizers are Jake Greer, who is to be manager of the company; R. Lee Greer and others.

COON VALLEY, WIS.—The Coon Valley Farmers' Telephone Company, of Coon Valley, Vernon county, has filed articles of incorporation. The capital stock is placed at $4,600, and among those interested in its formation are Louis O. Reve, Thomas Johnson and C. F. Bunkman.

MORRIS, WIS.—The Morris Telephone Company, which has a capital stock of $1,200, has been incorporated by C. H. Holun, Peter Frederickson, Thomas Larson and others.

SHEBOYGAN, WIS.—Farmers in the towns of Centerville, Mosul and Newton have organized a farmers' telephone company, whose purpose it is to erect a line from Sheboygan to Centerville, and to establish connections with the Newton-Manitowoc line at Cleveland, Wis. Charles Augustine has been elected president and Otto Wipperman secretary and treasurer.

PRINCETON, ONT., CAN.—Articles of incorporation have been filed by the Princeton and Drumbo Telephone Company of Princeton.

FRANCHISES.

SYCAMORE, ILL.—The DeKalb County Board of Supervisors has granted to the Exchange Telephone Company a franchise to operate in the county, and it is expected that work on a strictly up-to-date system is to be commenced at once.

CUSTER, S. D.—Application for a twenty-year franchise has been made to the town council of Custer by the Hermosa Telephone Company, of Hermosa. If it is granted it expects to install a modern telephone plant.

SASKATOON, SASK., CAN.—The Saskatoon Telephone Company has applied for a ten-year extension of its franchise, and asked the city to guarantee its debentures that the extensions petitioned for may be made.

ELECTIONS.

VALPARAISO, IND.—The Portage Home Telephone Company, which operates in Lake, Porter and LaPorte counties, with exchanges at Crisman, Wheeler, Chesterton, Valparaiso, Westville and Michigan City, and has a capital stock of $50,000, has elected the following directors: A. O. Dobbins, Wheeler; E. S. Miller, Valparaiso; E. F. Miller, Crisman; J. S. Robbins, McCool; J. N. Kelly, Westville; F. A. Malmstone, Toleston; E. A. Anderson, Lake; G. B. Tanner, Chesterton.

FREEWATER, ORE.—The Rural Telephone Company has elected the following directors: E. P. Jensen, L. B. Nell, C. W. Steen, A. J. Williams and James Kirk.

WAYNESBURG, PA.—The officers of the Greene County Telephone Company, which operates in Waynesburg, Jefferson, Carmichaels, Ruffs Creek, Sycamore, Rogersville and Oak Forest, are J. N. Scott, president; W. H. Baily, of Waynesburg, treasurer, and C. W. Waychoff, of Waynesburg, secretary. The above-named gentlemen and T. B. Lee, of Washington; S. S. Bayard, of Carmichaels; Thomas Hughes, Rice's Landing; George F. Luse, Carmichaels, compose the directorate.

WINDBER, PA.—The following officers have been elected by the Windber Telephone Company: President, Charles R. Glock, of Johnstown; vice-president, Harry Kinney, of Windber; treasurer, George Smith, of Windber; secretary and general manager, R. L. Sproat, of Windber.

SALEM, S. D.—The following officers and directors have been elected by the Salem Telephone Company: J. F. Schneider, president; L. S. Tyler, vice-president; S. M. Gilbert, secretary; D. Goldsmith, treasurer; directors, E. J. Todd, J. F. Schneider, L. S. Tyler, S. M. Gilbert, D. Goldsmith, W. A. Nye and C. M. Serles.

ALMA CENTER, WIS.—The Farmers' Mutual Telephone Company has elected the following officers: President, F. Putz; vice-president, Otto Oschner; secretary, E. C. Miller; treasurer, H. J. Korb. The company expects to build a number of new lines.

RICE LAKE, WIS.—At its annual meeting, the Northwestern Telephone Company, which owns and operates a line to Draper and points between, elected the following officers: W. H. Bundy, president; J. E. Horsman, secretary; E. L. Everts, treasurer.

SHELL LAKE, WIS.—The following officers and directors have been elected by the Bashaw Valley Telephone Company: President, E. E. Allen; vice-president, J. D. Sauers; secretary, G. L. Engstrom; treasurer, J. W. Bakken; directors, Eugene Mead, C. R. Merchant, J. W. Toll, M. W. Cable, J. W. Bakken, G. H. Swan, J. D. Sauers, G. L. Engstrom, John Lindholm.

FINANCIAL.

COLUMBUS, O.—At a recent meeting at Columbus, the Farmers' Telephone Company, of Fireside, decided to increase its capital stock from $25,000 to $50,000.

ARKANSAW, WIS.—The Arkansaw Telephone Company has increased its capital stock from $2,400 to $5,000.

BLAIR, WIS.—The Preston Farmers' Telephone Company, of Blair, Trempeleau county, at a recent meeting decided to increase its capital stock from $5,250 to $12,250.

MISCELLANEOUS.

WASHINGTON, D. C.—It is the intention of the signal corps to obtain an increase in the telephone systems at the interior posts, arrangements

WANTED—SPECIAL CORRESPONDENTS

OWING to the rapid growth of the Independent telephone movement in all sections of the country, we have openings for special correspondents in every State to work in conjunction with our already efficient corps. Matter similar to that in our Message and Operating Field pages is especially desired. For details address the Editor.

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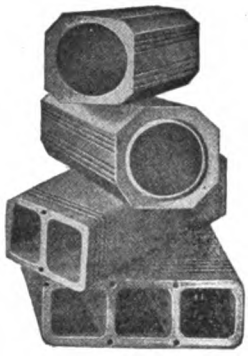

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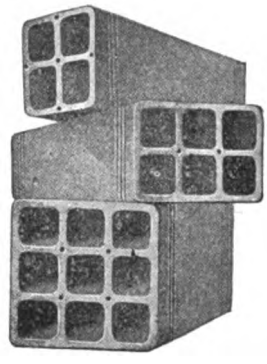

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Timely News

toward this end having already been made. It is proposed to install 2,452 instruments at a cost of $112,318, the installation to cover a period of two years.

ROCKPORT, ILL.—The name of the Rockport, Eldora & New Canon Telephone Company has been changed to the Gay Telephone Company, and its capital increased from $1,400 to $2,000.

PERRY, IA.—The controlling interest in the Hawkeye Telephone Company, which was organized at this city in 1895 with a capital stock of $350,000, was recently sold by President G. N. Bandy to the Brenton Bros., who formerly owned one-half of the company's stock. Charles R. Brenton is to be president of the company, and D. R. Griswold secretary and general manager.

ANDERSONVILLE, MICH.—Plans are under way by the farmers of this city for the formation of a Farmers' Rural Telephone Company, whose purpose it is to construct a line between Andersonville and Coleman.

MAPLE RAPIDS, MICH.—Arrangements are being discussed for the connection of the lines of the Fulton Farmers' Telephone Company and the Union Telephone Company at this city.

WHEELING, WEST VA.—At a recent meeting held at this city it was practically decided to merge all the toll lines of the Pittsburgh & Allegheny Telephone Company, the Belmont Telephone Company, the West Virginia Western Telephone Company, of Parkersburg, and the Clarington Telephone Company, of Clarington, O., into a single long distance system, which would afford the Independent companies continuous long distance facilities from Pittsburgh to Parkersburg.

VICTORIA, B. C., CAN.—Among the improvements in the province provided for in the estimates by the Dominion Government are the following: Vernon-Kelowna-Penticon telephone line, $2,500; improvements to the Victoria-Cape Beale line, $6,000; Vernon to Lumby telephone line, $1,700, and an extension to the Salt Springs Island telephone line to Pender and Mayne Island, $2,000. Particulars may be had from F. Gelinas, secretary of the department of public works, Ottawa, Ont.

PERSONAL.

DR. R. F. BLONT, of Wabash, one of the pioneers of Independent telephone service in Indiana who organized the Home Telephone Company of Wabash, has retired from the presidency after sixteen years of service. Dr. Blont has been prominent in every Independent telephone meeting in Indiana during the past decade.

G. W. JOHNSON, of Ann Arbor, has been appointed manager of the Flint exchange of the Michigan State Telephone Company.

Onward

POTTER, ARK.—Among the extensions recently made by the Potter Telephone Company is a line from Southwest City into Oklahoma, and other improvements and extensions are being considered.

CORTEZ, COLO.—It is reported that the government expects to construct a telephone line between Cortez and Dolores for the convenience of the reserve riders.

JULIAETTA, IDAHO.—Many improvements and extensions in its plant at this city are being made by the Potlatch Telephone Company, and it is planning, as soon as the work at this point shall have been completed, to erect a line to Troy.

KINGSTON, ILL.—The lines of the Boone County Rural Telephone Company are to be extended in this city.

STERLING, ILL.—The Interstate Telephone Company, which has been making many improvements in its cable plant at this city, expects soon to take up the work of overhauling its lines in Morrison.

FORT WAYNE, IND.—The Nine Mile Telephone Company, of Nine Mile, Ind., P. O. address Ft. Wayne, which has connections with Ft. Wayne, Roanoke, and other towns in Allen and Huntington counties, expects to make many extensions in its lines.

FOWLERTON, IND.—The Citizens' Telephone Company, of Fairmount, Ind., has installed its exchange in a recently purchased building at this city and has under consideration many other improvements in its system.

ROANOKE, IND.—To take care of its rapidly increasing business, the lines of the Roanoke Telephone Company are to be materially extended.

GRAND JUNCTION, IA.—Plans are being discussed by the Mutual Telephone Company looking toward the erection of a new toll line between Patton and Grand Junction.

HUXLEY, IA.—The Nevada Mutual Telephone Company is rebuilding its line from Huxley to Slater.

IOWA CITY, IA.—A new copper line between this city and Riverside is being erected by the Johnson County Telephone Company. When the work has been completed the company will have installed a complete copper metallic circuit from Iowa City to Ottumwa, and thence to other parts of the State.

SABETHA, KAS.—Among the improvements being made by the Mutual Telephone Company at this city is the installation of a new switchboard.

HINDMAN, KY.—The Hindman Telephone Company, of which S. R. Blair is manager, expects to construct a local line from Hindman, via Beaver Creek, to Hall, Ky., twenty-four miles.

SERGENT, KY.—Construction work on the Sergent-Ola Telephone Company's line from Colly, Ky., to Hillard and Orlena, seven miles, has been commenced. W. B. Webb, of Sergent, Ky., is manager of the company.

HARRISON, ME.—The lines of the Maine Telephone Company are being extended in Harrison, Waterford, Otisfield and other places.

DEXTER, MICH.—The Washtenaw Home Telephone Company has just completed the construction of a new line between Dexter and Jackson, and is considering the advisability of still further extending its system.

MEDFORD, MINN.—New lines are being erected by the Straight River Telephone Company in this city.

BILLINGS, MONT.—The Mutual Telephone Company, of Billings, has recently installed a new exchange at Bear Creek, with about twenty-five subscribers, and is considering other extensions.

KEARNEY, NEB.—To take care of its rapidly increasing business the plant of the Kearney Telephone Company is being materially enlarged.

AVOCA, N. Y.—The Overland Telephone Company, which operates an exchange at this city, contemplates the extension of its system to Bath. Work is to be commenced at once.

THERESA, N. Y.—In order to give service to its greatly increased number of subscribers, the Theresa Telephone Company has recently purchased the block owned formerly by J. C. Morrow, and expects to install in it a modern telephone office.

DEMOCRAT, N. C.—When the new construction work which has been planned by the North Buncombe Telephone Company has been completed it will be able to give its subscribers connections with Asheville, Barnardsville, Morgan Hill and Mars Hill. It is proposed by the company to make its plant modern in every particular.

STATESVILLE, N. C.—Among the extensions contemplated by the Amity Telephone Company are lines from Amity and Elwood to Statesville, where connections are to be established with the Iredell Telephone Company.

COLUMBUS, O.—To take care of the large amount of new business which it has acquired on the north side of the city, the Citizens' Telephone Company has purchased a building there, in which it expects to install an up-to-date branch exchange.

BLACKTOWN, PA.—The Blacktown Telephone Company (P. O. Mercer, Pa.), has just installed a new one-hundred drop switchboard. The company now has about 125 telephones in service. It is entirely a rural system, every subscriber being also a stockholder in the company.

HARRISVILLE, PA.—The Harrisville Telephone Company has recently installed a new one hundred line switchboard. The company has now upwards of 100 telephones in service, and is in a very prosperous condition. It has recently erected several miles of new line.

HAZLETON, PA.—A telephone line between Hazleton and Delano is being erected by the Lehigh Valley Railroad Company.

GREENWOOD, S. C.—The Greenwood Telephone Company is making preparations to install a new switchboard. The president of this company is J. W. Sproles, and G. A. Barksdale is secretary and treasurer.

DOLAND, S. D.—The South Dakota Farmers' Mutual Telephone line has been completed to Dolan, and connection has been made with the central office there. This gives Doland connection with practically all of the farmers in the southeast part of Spink county.

LANGLEY, WASH.—A new line from Langley to Clinton is among the improvements planned by the Whidby Telephone Company.

ANDERSON, W. VA.—A new line is being erected by the Anderson Telephone Company from Sugar Grove, W. Va., to Bridgewater, a distance of about twenty-seven miles, which, when completed, will put its subscribers in communication with Rockingham and the adjoining counties.

CEDARBURG, WIS.—The Freistadt Telephone Company is extending its lines in Cedarburg and into the surrounding country.

HELENVILLE, WIS.—The Johnson Creek Telephone Company is building a line in Helenville.

LAKE NEBAGAMON, WIS.—Many improvements in its plant at this city are to be made by the People's Telephone Company.

CRESTON, B. C., CAN.—The Creston Telephone Company has extended its line to Port Hill, Idaho, and is considering a long distance line to Cranbrook, B. C.

BLENHEIM, ONT., CAN.—The Blenheim & South Kent Telephone Company, which has already built about thirty miles of line, expects to still further enlarge its plant.

SOMBRA, ONT., CAN.—The South Lambton Telephone Co-operative Association, Ltd., contemplates the construction of about ten miles of new line.

REGINA, SASK., CAN.—The provincial government has decided to build a net work of telephone lines over the province, and install local exchanges in a number of the cities and larger towns. Address Francis Dagger, telephone expert for the province, Regina, Sask.

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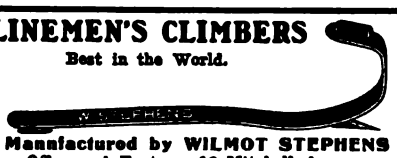
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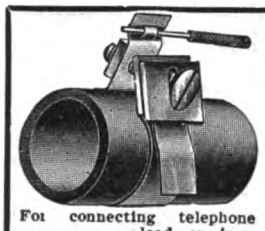
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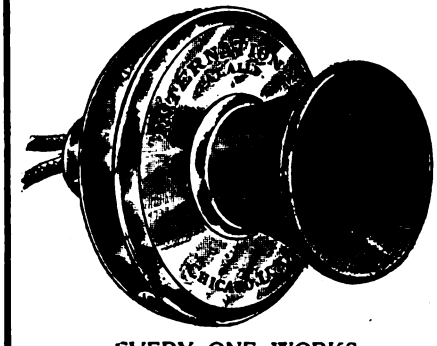

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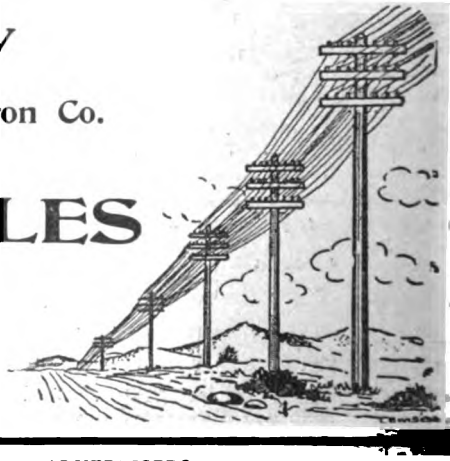

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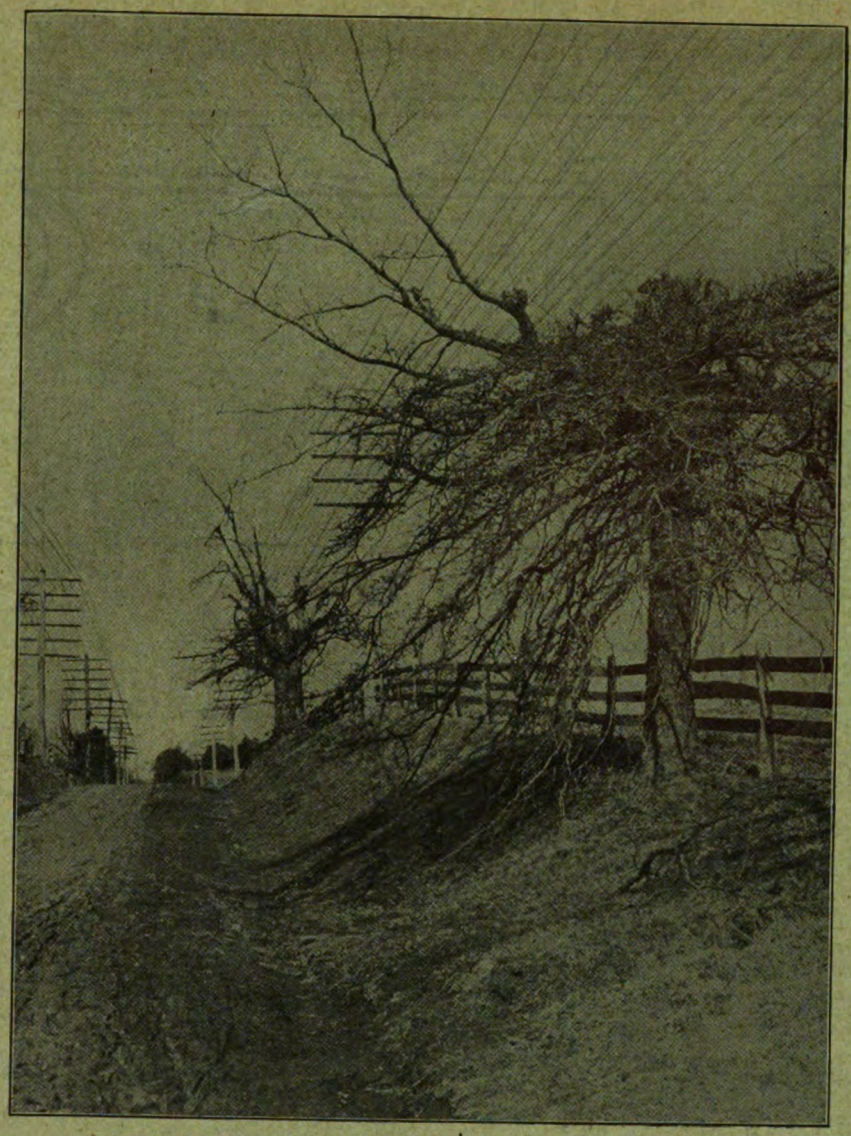

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